Groove in Cuban Dance Music: An Analysis of Son and Salsa

Thesis

Groove in Cuban Dance Music: An Analysis of Son and Salsa

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Submitted for examination towards the award of Doctor of Philosophy on 3 September 2012

Date of Submission: 1 September 2012

Date of Award: 7 May 2013

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Abstract

The rhythmic feel or 'groove' of Cuban dance music is typically characterised by a dynamic rhythmic energy, drive and sense of forward motion that, for those attuned, has the ability to produce heightened emotional responses and evoke engagement and participation through physical movement and dance. No single work on groove in Cuban dance music considers together the cognitive, cultural, socio-musical and emotional dimensions of the music-making practices and aesthetics that characterise groove production. This study integrates these perspectives into a single theoretical framework with the aim of gaining fresh insights into the nature of groove in two prominent styles of Cuban and Cuban-related dance music: *son* and salsa.

Methodologically, this study blends ethnography and the analysis of timing data extracted from real-world performances to explore the shared cultural knowledge, socio-musical processes, aesthetics and emotional dimensions of groove. Ethnography facilitates the detailed investigation of how performers talk about the music-making practices that characterise aspects of musical culture while the use of timing data, recorded in situ, facilitates the investigation of the real-time nuanced micro-timing relationships that shape effective groove production.

The findings of this study paint a picture of groove that is rich, complex and multi-dimensional, one that is built upon the expressive performances, socio-musical

interactions and collectivist attitudes of rhythm section musicians as well as powerful cultural models and intersubjectively shared knowledge. When rhythm section musicians engage in expressive and interactive dialogues and work effectively as a synchronous collective, the resultant groove embodies the dynamic rhythmic, communicative and emotional energies of the individuals that comprise the group. In performance situations, when the groove of the rhythm section spontaneously finds union with the kinaesthetic and emotional energies of dancers and audiences, the cumulative energy possesses the power to inspire, excite, energise, invite participation and unite people in joyous celebration.

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Acknowledgements

I owe my deepest thanks to the many people who have kindly given their help, support and guidance over the four-year development of the study. I am especially grateful to the talented musicians in the UK, Spain and Cuba who gave their time, kindly welcomed me into their homes and workplaces, and offered thoughtful insights that helped me to understand the complex nature of groove production. I would like to thank the wonderful Cuban musicians who tolerated my shaky Spanish and showed me what it means to perform with Cuban musical sensibilities, in particular Jesus Bello from Sierra Maestra and Jesus 'Toto' Martinez from Clave y Guaguancó. Thanks also to the musicians in Spain and the UK who agreed to be interviewed and recorded for this project, without their participation there would be little to write about and nothing to ground my theorisations and analyses.

Thank you to my co-performers in Riamba, and in particular bandleader Andy Martin, for tolerating my absence during the latter stages of this project, and to musician Sara McGuinness for assisting with contacts in Cuba. For assistance with contacts, interviews and accommodation in Spain and helping to translate the many hours of interview material that have been central to this study, special thanks to singer Graciela Rodriguez.

My thanks also go to colleagues at the Open University, principally my extremely knowledgeable and patient supervisors, Professor Martin Clayton and Dr Byron Dueck, for their kind help and support, and perfectly judged insights that have undoubtedly made this thesis more credible. I would also like to thank other colleagues at the Open University and elsewhere who helped with fieldwork recordings, showed me how to work recording equipment, how to navigate numerous software applications or simply offered kind words of encouragement. Udo Will, Laura Leante, Simone Tarsitani, Mark Doffman, Andy McGuiness, Katia Chornik, Morgan Davies, Jim Hoyland, Tony Kapcia at the Cuba Research Forum, Jan Fairley (who sadly died near the completion of this research in June

2012) and Maria Fernandez-Toro all helped in overcoming the many challenges presented by the research process.

Finally, my most sincere thanks go to my wife, Dinah and our son and daughter, Dominic and Alexandria, for their continued and unwavering support, patience and love. It seems only fitting that this thesis is dedicated to their generous human spirit.

Chapter 1

Introduction

On the evening of the 24 February 2009, I attended a religious *santería* music/dance event in a small temple-house in Cerro, a residential district of central Havana. This was very much a community gathering for Cubans (mainly Afro-Cubans) from the surrounding streets. The front door was left open, with people coming and going freely and with some participating from the street by singing and dancing. The ages were mixed (children through to adults) and the ceremony was part-funded by contributions from participants, who placed money in wooden dishes placed in front of the shrine dedicated to Changó – the Yoruba *orisha* or deity of thunder and lightning and owner of the *batá* drums (Cornelius and Amira 1992; Hagedorn 2001; Sublette 2004).

As well as a religious ceremony, this type of *santería* event was also rooted in a more everyday kind of sociability and during breaks in the proceedings participants talked, hugged, smoked, drank and wandered outside for some fresh air or stayed in the temple-house in order to consult the initiate about all manner of social, monetary and spiritual problems. There was also a strong sense of inclusion and participation (as an outsider I was encouraged to sing, dance and clap key rhythms such as the *clave*) and even the theatrical: I noticed two large men dressed, very unconvincingly, as women with sequined leggings, low-cut tops, wigs, make up and with shaved and re-painted eyebrows.

The principal instruments used in the *santería* ceremony were the sacred *batá*: a set of three, double-headed, hourglass-shaped drums (called, from largest to smallest, the *iyá, itólele* and *okónkolo*) played horizontally on the lap of the *olubatá* or *batá* drummer (Cornelius and Amira 1992; Leymarie 2002; Rodríguez 1998; Roy 2002). I was struck by how the skilful improvisations and rhythmic interactions of the *batá* drummers play a

crucial role, helping to create and control the pace, intensity, energy and drive of the event. The dynamic rhythmic energy generated by the *batá* drummers also appeared to invite participation and engagement, somehow inducing bodily excitation and creating a sense of motion that drew people together and pulled them along with the music. This ability of the rhythmic energy of the music to generate a sense of togetherness and participation was of considerable importance for ceremonial purposes. The combined energies of *batá* drums, dancers and singers came together as a synchronised collective force that built towards an intense and euphoric ceremonial climax: animal sacrifice (a tortoise in this case, but roosters and pigs are also common) and ultimately the possession of the *santería* practitioner by the spirit of the *orisha*.

During my time in Cuba, I also attended many secular music/dance events. Whilst experiencing *son* and salsa performances in venues such as the Casa de la Mùsica and Egrem (Empresa de Grabaciones y Ediciones Musicales) in Havana, for example, I noted that these popular dance music forms possess a similar power to move bodies, invite participatory dance and generate a sense of togetherness and synchrony amongst participants. Again, the rhythmic energy generated by skilful improvisations and interactions within the rhythm section (e.g. percussion, bass, piano) was of central importance, helping to control the pace, intensity and drive of the proceedings. Like participants in the *santería* ceremony, audiences at secular music/dance events often clap the *clave*, and participate by singing the *coros* (choruses) and by dancing in time with the music. Further, I noted that when the band was playing particularly well, musicians often exhibit tangible signs of euphoria, increased energy and possession-like physical excitation as they work collectively to generate a sense of drive and excitement in the music. Dancers and other audience members also seem to tap into and feed off the music's energy, and in turn contribute their own rhythmic and physical energy through percussive bodily movements.

Before visiting Cuba, in my life as a working musician I had over ten years experience of performing Cuban and Cuban-related dance music such as *son* and salsa in London and other parts of the UK. During the performance of these dance styles, I became acutely aware that similar rhythmic sensibilities, aesthetics and music-making practices also underpin these musical experiences. For example, knowledge and correct execution of key rhythms such as the *clave* are of central importance when trying to achieve the desired 'feel' of Cuban dance musics; a premium is placed on close interaction, particularly between musicians within the rhythm section (percussion, bass and piano); and the ensemble aims to work as a synchronous unit in order to generate a sense of rhythmic energy, excitement and drive in the music. Audience participation through movement and dance is also central to these events, adding additional energy and drive to that supplied by the musicians. Moreover, it has been my experience that musicians, audiences and promoters alike usually see it as a marker of a successful performance if the collectively generated rhythmic energy builds in intensity and excitement, and participants experience feelings of elation and physical excitation, and dance in time with the music.

The experiences described above provided the primary incentive for this study. They suggest that the live performance of many Cuban and Cuban-related dance musics share common musical practices, rhythmic features and aesthetics. More specifically, they suggest that close rhythmic interaction, synchronous ensemble behaviour and key rhythmic patterns like the *clave* play a central role in shaping the dynamic rhythmic feel or 'groove' (Monson 1996: 1) of Cuban dance musics. The groove appears to be the primary aesthetic force that propels the music along helping to generate the required energy and drive that characterises both sacred and secular music events. In the case of *santería* performance, this aesthetic force plays a central role in bringing down the *orisha* and provoking participation and dance. There also appear to be strong connections between groove and audience participation in secular music events and the sense that the groove

occupies a central role in providing an energising force that binds people together through participatory movement and dance.

There are, of course, notable differences between the events described above. Firstly, in *son* and salsa performances, bongó, congas, bass and piano, and other instruments, instead of *batá* drums, form the heart of the rhythm section. Secondly, there is no spiritual possession or animal sacrifice in secular music performance. In commercial venues such as the Casa de la Mùsica in Havana and venues where I am frequently employed in the UK, the focus is to make money, entertain and provide good music for people to dance to. Thirdly, ensembles playing *son* and salsa in the UK and particularly in London are typically comprised of musicians from a variety of cultural backgrounds (Europeans like me, as well as Latin Americans and Cubans) whereas ensembles performing *son* and salsa in Havana are comprised of mainly Cuban musicians, with *santería* performance mainly being practiced by Afro-Cubans. Fourthly, audience participation manifests itself in different ways in different locales. I have never seen, for example, audiences in the UK clap the *clave* in time with the band's groove; this suggests that certain aspects of audience engagement are culturally specific.

When comparing these musical experiences there are clearly a number of factors that might influence the groove in *son* and salsa performances: musical, as well as contextual, economic and cultural. However, at the core of the Cuban musical aesthetic lies the ability of the musicians to interact effectively and work collectively to generate a groove that energises the room, makes people want to participate and connects them in a shared euphoric experience. And it is the investigation of this aesthetic experience that lies at the centre of this study. In order to explore further what underpins this experience it will be instructive to consider the origins of the key musical practices and socio-cultural features that have shaped the development of contemporary Cuban musical performance. As my

focus is the groove of *son* and salsa styles, it is the origins of the musical practices that have characterised these styles that will be outlined next.

Son and Salsa: Context and Themes

Son and salsa are two related complexes of popular music and dance, with *son* the older of the two. The term *son* is derived from the Spanish verb *sonar* (literally, to sound) and denotes a group of interrelated music and dance practices that developed in Cuba in the latter half of the nineteenth century as a regional folk genre. Whilst the precise origins of *son* have been the subject of some debate (Lapidus 2005; Loza 1984; Manuel 2009; Robbins 1990), literature suggests that it developed in the easternmost region of Cuba where it was born from the socio-musical interactions of rural workers of Iberian origin, mainly from Andalusia and the Canary Islands, and labourers of African descent, especially those from the Yoruba, Congo, Carabili and Dahomey ethnic groups (Carpentier 2001; Castellanos and Castellanos 1987; Fernandez 2006; Leymarie 2002; Orovio 2004; Rodríguez 1998; Roy 2002; Sublette 2004).

As *son* became increasingly popular during the twentieth century and travelled from its rural setting in the east of Cuba to urban areas such as Havana in the west, it absorbed influences from a myriad of different genres. These include African-inspired instrumentation (e.g. *congas, bongó* and cowbell), structural forms (the rhythmic open-ended improvisatory *montuno* section) and choreographies – influences that were probably acquired from co-emerging and related Afro-Cuban dance musics such as *rumba*[1]. Additionally, European musical forms have also influenced the development of

[1] Rumba (*yambú*, *guaguancó* and *columbia* are the three main styles) is a dance music complex that developed during the late nineteenth century in the marginal suburbs of Havana and Matanzas in western Cuba and was strongly associated with poor, black, working-class Cubans who lived in *solares* (buildings subdivided into small habitations and organised around a large, communal, central courtyard). The term *rumba* loosely describes a 'collective event', 'atmosphere', 'feeling' or 'party', as well as a musical style. In contemporary Cuba, *rumba* is still a dynamic, vibrant and hugely influential musical form (Acosta 1991; Carpentier 2001; Crook 1982; Daniel 1995; Leymarie 2002; Manuel and Fiol 2007; Moore 1995; Pasmanick 1997; Rodríguez 1998; Roy 2002; Sublette 2004).

son. These can be seen in its instrumentation (e.g. initially Spanish guitar and later piano, double bass and brass), its structure (the inclusion of the initial song-like section, generally in binary form), harmonic sequences (e.g. I-IV-V) and vocal delivery – the Iberian-inspired *décima*-like poetic improvisations (Rodríguez 1998; Roy 2002; Sublette 2004). Furthermore, several scholars argue that throughout the twentieth century *son* has enjoyed a mutually influential relationship with North American musics such as jazz. Of this relationship, musicologist Maya Roy writes, "In Cuba, the 1930s saw a proliferation of jazz bands. Their repertoire was originally made up of U.S. dance rhythms, but gradually they began to play Cuban rhythms and fused them with jazz orchestrations and improvisations" (Roy 2002: 141; see also Fernandez 2006 and Sublette 2004).

Salsa's equally complex history has given rise to considerable polemic in academic literature. Some of the principle questions within this polemic are: is *salsa* an original musical form or merely a copy of 1940s and 1950s Cuban dance music? Is it a musical genre, a concept, a way of making music or a term used to describe how Latin dance music feels? Is it a grassroots socio-musical complex or a convenient commercial label created by the US music industry? (Acosta 2004; Blum 1978; Boggs 1992; Perez 1987; Manuel 1991a; Waxer 2002a). Amidst this polemic, most scholars agree that its first exponents were the working-class Puerto Rican and Cuban diaspora living in New York during the 1960s. During this time the term *salsa* (literally meaning "hot sauce" but denoting music that is soulful, gutsy and tastes good, Blum 1978: 144) was coined by the founders of Fania, a New York-based record label who used it as a catchy marketing label to promote their artists (Manuel 1995: 74)[2].

When considering *salsa's* relationship to Cuban dance music there is, of course, considerable debate. Some writers argue that *salsa* is nothing more than repackaged

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[2] It is highly probable that the term *salsa* was also in general use throughout the wider Caribbean musical community: Cuban *sonero* Igancio Piñeiro used the term in his 1933 composition, Échale

Cuban dance music while others emphasise its Puerto Rican heritage. Ethnomusicologist Peter Manuel has perhaps been the most forthright exponent of the Cuban-centred perspective, suggesting "that in stylistic terms *salsa* is essentially second-hand Cuban music" (Manuel 1994: 264), "firmly rooted in the rhythms, formal structures, harmonies, and instrumental styles of the dominant genres of Cuban dance music, the *son/guaracha/rumba* complex" (Manuel 1994: 266). By contrast, exponents of the Puerto Rican-centred perspective claim that "salsa is...the unmistakeable voice of the Puerto Rican *barrio*...it combines indigenous folk traditions such as the [Puerto Rican] *plena* and Afro-Caribbean *bomba* with foreign musical elements such as Cuban *son* and American jazz" (Duany 1992: 81-82)[3].

However, many musicians and scholars typically adopt a more balanced and broader perspective, postulating that *salsa*, although stylistically based on a Cuban and Puerto Rican model, has become a reinterpretation of Cuban and Puerto Rican dance music, incorporating influences from US jazz, soul and rock, *cumbias* from Columbia, *joropos* from Venezuela, *paseítos* and *tamboritos* from Panama, *sambas* from Brazil, and the Dominican *merengue*, to name but a few (Berríos-Miranda 2002; Gerard and Sheller 1989; Leymarie 2002; Orovio 2004; Roberts 1992; Waxer 2002b, 2002c).

The primary musical connection between *son* and salsa is that both are musical traditions that are based on the *clave*: a term that denotes the instrument (cylindrical hardwood sticks struck together) and the cyclical rhythmic pattern that forms the structural basis of

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Salsita/Put a little sauce on it, and Venezuelan DJ Phidias Danilo Escalona and New York publisher Izzy Sanabria have also been associated with usage of the term (Waxer 2002c: 6).

[3] In any discussion regarding salsa's Cuban and Puerto Rican heritage one should consider that these musical cultures have not developed in isolation. Several authors argue that the two islands have enjoyed a special relationship since the Spanish colonial period sharing a common Amerindian, Spanish and African cultural ancestry, and during the nineteenth and twentieth centuries, economic, military, commercial and musical interaction was considerable (Manuel 1991b, 1994, 1995; Duany 1992). Of this relationship Puerto Rican poet Lola Rodríguez de Tió wrote the oft-quoted lines: Cuba y Puerto Rico son de un pájaro las dos alas.../Cuba and Puerto Rico are two wings of the same bird...(quoted in Manuel 1994: 251).

the rhythm-harmonic performance framework within which the groove of *son* and salsa is generated. There is some debate surrounding the precise nature of its cultural origins: Cuban author Fernando Ortiz, for example, argues that *clave*-like instruments are used in many West African ensembles and also in the folk traditions of Andalucía (Sublette 2004: 95) while other scholars suggest that the *clave* evolved in the Havana musical milieu[4] (Orovio 2004: 54). Whatever its origin, many musicians and authors argue that the *clave* provides a fundamental rhythmic guide that stabilises the expressive interactions of *son* and salsa ensembles, provides an anchoring rhythm for dancers, and serves as a structural and aesthetic foundation for composition and performance (Leymarie 2002; Mauleón 1993). It seems possible therefore that the *clave* is of considerable importance in shaping the groove of *son* and salsa and acts as a point of aesthetic connection between these interrelated traditions.

Secondly, contemporary *son* and salsa styles typically feature certain additional rhythmic-harmonic ostinati (or *tumbaos),* played within the rhythm section: namely by the bass, piano/*tres*[5] and percussion. These archetypal *tumbaos*, along with *clave*, form the rhythm-harmonic framework within which groove in generated (Mauleón 1993, 1999). Several scholars have argued that the way in which these *tumbaos* fit together may have important considerations for groove, helping to generate a sensation of motion and drive that is central to *son* and salsa music/dance events (Manuel 1985; Peñalosa 2009; Washburne 2002).

Thirdly, scholars investiga ting the rhythmic feel of Cuban dance musics p ut forward arguments that suggest the role each instrument plays within the rhythm section helps to

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[4] It is probable that the term *clave* is a derivative of the Spanish *clavijas*, the name of the rounded hardwood pegs used in shipbuilding in early colonial Cuba. During this period, musicians often worked in the shipyards of Havana and Matanzas as carpenters, masons and labourers alongside African slaves, Spanish prisoners and *guajiros* (white Cuban farmers). It is likely the *clave* was the musical child of this interracial locale (Fernandez 2006: 26; Sublette 2004: 94).

[5] The *tres* is a Cuban adaptation of the Spanish guitar with three double strings (Courlander 1942; Orovio 2004; Rodríguez 1998).

create sensations of tension and 'pull' within Cuban grooves. According to these arguments, instruments such as the *clave* fulfil a steady, time-keeping function with little or no pattern variation, whilst the bass and piano/*tres* for example, fulfil a more improvisatory role that allows greater freedom to execute lyrical variations of standard patterns. It is possible, therefore, that these respective roles play a part in shaping the groove by providing an internal tension and pull in the music, created by the juxtaposition between these contrasting yet complementary instrumental parts (Daniel 1995; Manuel 1988, 1998).

Fourthly, in many Cuban dance styles songs typically follow the binary *son-montuno* structure. This structure is characterised by an initial song-like section (known variedly as the *largo*, *canto*, *tema, guia* or simply *son*), which places an emphasis on melody, harmony and lyrics, followed by an extended *montuno* (or *estribillo*) section that features call-and-response singing, improvisations and arranged instrumental breaks (called *mambos* or *moñas*) over repeated rhythmic-harmonic ostinati. It has been argued that as the performance moves from the *son* to the *montuno* section the tempo often increases and the flavour and character became less solemn and more vivacious and exciting (e.g. Loza 1984: 112). Therefore, the transition from *son* to *montuno*, and its associated change in tempo, feel and aesthetic, is potentially of some importance to the study of grooves, perhaps helping to build intensity and energy in the music.

Lastly, *son* and salsa, and the musical practices and aesthetics that characterise them, have historical roots in working-class community life. As mentioned above, while the exact origins of *son* have been the subject of some debate, in its early forms it was typically associated with rural communities who lived in and around eastern regions of Cuba. In the rural context in which it was born, the term *son* referred to any open-air collective celebration or party with music and dancing. These social gatherings, according to Cuban musicologist Olavo Rodríguez (1998), were crucial to early rural life in Cuba as patterns of

settlement were not like those in Europe where houses were in close proximity to each other, forming small villages. Cuban farmers lived and worked on small isolated plots of land and local celebrations – known in various parts of Cuba as a *guateque, changüi* or *sucu-sucu* – were created with one specific purpose: to break the isolation and to bring people together to commune with others (Rodríguez 1998: 67).

Early incarnations of salsa, like *son*, seemed to fulfil a similar social need by bringing people together in celebratory music and dance. From its inception in the 1960s the first exponents of salsa were working-class Latinos (mainly Puerto Rican and Cubans) living in New York. Peter Manuel argues that during this time the term salsa "emerged as a product primarily of the Latino communities in New York barrios, affirming their growing sense of ethnic and class identity in the face of social, economic, and political marginalisation and exploitation" (Manuel 1994: 271).

As music and dance forms, *son* and salsa have continued to develop and mutate, and have perhaps moved away from their community roots, enjoying considerable international presence and influence. For example, in the 1930s the tune *el manisero,* a Cuban *son,* famously became a hit in the US as part of the "rhumba craze" – "rhumba" spelt with a "h" was actually *son* mislabelled in the US and other English speaking countries (Moore 1995, 1997; Roberts 1979) – and throughout the twentieth century *son* and other Cuban dance musics have influenced African popular music (Angeloro 1992; Rodríguez & Fairley 2005; Shain 2002; Wilson 1974). From the 1970s onward salsa emerged from its roots in the Caribbean and US to achieve international popularity in Venezuela and Colombia (Waxer 2002c, 2002d), London (Román-Velázquez 1999, 2002), Japan (Hosokawa 2002), Sweden, Canada (Waxer 2002b) and Africa (Angeloro 1992), for instance, and spawned a bewildering array of sub-genres. These include *salsa romántica* (romantic salsa), *salsa monga* (limp *salsa*) (Washburne 2002), *salsa dura* (hard salsa), *salsa erótica* (sensual salsa), *salsa africaine* (African salsa), soulful salsa, dance

club salsa (Waxer 2002b: 10-12), and Latin Soul and Boogaloo (Flores 2002; Salazar 1992).

As Lise Waxer argues in her collection of articles that form *situating salsa,* as salsa becomes more popular with global audiences, it also has to negotiate the shifting trajectories of "production and distribution in the multinational music industry" (Waxer 2002b: 9), making it increasingly difficult to situate salsa culturally, musically and stylistically within such categorisations as "Cuban", "Puerto Rican", "Latin" or as a regional, transnational (cutting across national boundaries) or global (truly worldwide) musical form (Waxer 2002b: 8). The complex issues of categorisation, commercial labelling and identity, and how musical genres are situated within the global-local matrix are not unique to salsa and are perhaps equally pertinent for all forms of globalised, mass-marketed, popular music (Middleton 1990; Taylor 1997) with which salsa has been increasingly associated (Pacini Hernandez 1998; Skinner 2007; Waxer 2002c: 14-18). Despite the diversity of issues and agendas surrounding salsa in its many international forms, an overarching theme runs through the academic literature and is one that is shared by salsa musicians, dancers and aficionados around the world: good salsa, like Cuban *son* , should exude energy, vitality and joy and shou ld be played with *sabor* (flavour, passion). And, above all, the dynamic *afinque* (swing, groove) of *salsa* should propel the music forward and possess the power to raise voices and move bodies.

Related Extant Studies: Approaches to Groove

The themes and arguments outlined above provide an extremely useful starting point for the investigation of the nature of groove in *son* and salsa and in particular highlight how community-orientated attitudes and certain musical practices (e.g. the *clave* and *son-montuno* structure) might contribute to the characteristic groove and aesthetic of contemporary *son* and salsa performance. When viewed through the lens of the present study, this literature falls short of detailing the precise nature of the relationship between

these practices and broader notions of groove. While groove has not received widespread attention in academic literature, a handful of extant studies do however provide some interesting perspectives that shed light, in a more general way, on the notions of groove in Cuban dance music.

One such study is Zbikowski's (2004) examination of the cognitive processes that facilitate effective groove production. In his article, *Modelling the Groove*, Zbikowski attempts to characterise the knowledge structures or cognitive models that underlie interactive groove production in jazz, funk and other styles of popular music. He argues that:

> Both the musicians' and the listeners' model for the groove thus combine embodied knowledge and conventional (or stylistic) knowledge, and this knowledge can be either explicit or implicit. Modelling the groove is not a simple matter of propositional knowledge, any more than it is an unthinking response to sonic stimuli. It is instead the result of a process where, as individual humans, we interact with what we hear as well as with the social and cultural context within which that hearing takes place (Zbikowski 2004: 289).

Zbikowski makes connections between notions of groove and the important role of shared cultural knowledge in effective musical interaction. Later in the same article, he makes a more solid connection between shared cultural knowledge and the process of interactive groove production:

> Being a member of a musical culture means knowing how to interact with the musics specific to that culture. When listeners respond to a groove, they are demonstrating a particular kind of cultural knowledge, characterized in part by the

> conceptual model...it is also a prerequisite for the musicians producing groove (Zbikowski 2004: 280).

Zbikowski's arguments underscore the importance of interaction in the cultivation of shared knowledge, shared musical sensibilities and the generation of a collective groove. Relating these arguments to groove production in Cuban dance music, the widespread use of key rhythmic patterns and performance structures such as the *clave* and *son-montuno*, suggest that these musical features can be viewed as part of the shared cultural knowledge within the Cuban musical tradition, shared knowledge that is, as Zbikowski asserts, "a prerequisite for the musicians producing groove".

In a related study, Keller exams the cognitive processes that enable effective 'Joint Action in Music Performance'. Drawing on his research into Western classical piano duo performances, he argues that "performers intentionally and actively participate in making sense of the music so that its 'meaning' is shared among co-performers and communicated to audience members. This interactive form of enaction requires performers to be sensitive to the subjective states expressed by his or her co-performers. Musical joint action therefore exercises the human predisposition for intersubjectivity" (Keller 2008: 206). Although Keller does not specifically address the notion of groove, he does make a clear connection between "musical joint action" – like that required in the production of a collective groove – and notions of intersubjectivity. Keller's arguments are intriguing and suggest that when interacting to negotiate a successful groove, performers of Cuban dance musics may also exercise, as he puts it, "the human predisposition for intersubjectivity".

Studies of jazz timing and temporality also provide some interesting perspectives on interactive groove production and the importance of shared knowledge. One such study is

Doffman's 2008 investigation of shared time and its meaning in jazz trio performance. He makes very explicit connections between collective groove production, notions of intersubjectivity and shared cultural knowledge, arguing that:

> Groove is the emergent property of the group...timing may be the property of an individual but groove results from timing relationships emerging from the entrainment between players...groove is the feeling of entrainment, inflected by intersubjective temporal models, and expressed through the cultural norms of jazz (Doffman 2008: 235, 236, 295).

Doffman argues firstly, that groove is a dynamic group phenomenon born from the expressive timing relationships between group members. Secondly, like Keller and Zbikowski, he argues that intersubjective knowledge and cultural norms contribute to and shape the sound and groove of jazz performance. Thirdly, he argues that the process of 'entrainment' between musicians plays a key role in binding together members of the group when generating a collective groove. Relating these ideas to my own experiences, mentioned at the beginning of this chapter, Doffman's arguments suggest that timing relationships and entrainment, as well as shared cultural knowledge, all play a central role in binding Cuban ensembles together during live performance as they work together as a synchronous unit to generate a collective groove. Another feature of Doffman's work is his use of micro-timing data to detail the precise nature of the timing relationships that underlie groove production in jazz. Such an approach, when combined with ethnographic data, allows meaningful connections to be made between musicians' micro-interactive behaviours and specific socio-cultural and musical practices that might contribute to groove.

The approaches taken by Doffman, Keller and Zbikowski have slightly different emphases. Keller and Zbikowski emphasise the role of intersubjectively shared knowledge and the cognitive structures that enable effective musical joint action and groove production. While Doffman approaches groove from a psychologically informed perspective, similar to that of Keller and Zbikowski, he also offers a socio-cultural interpretation of timing, temporality and groove in jazz, which connects with a more ethnomusicological-orientated approach to the study of groove – an approach I am keen to promote in the current study. However, the work of the above-mentioned scholars says little about groove in dance music and how groove might help to develop a sense of collectivity and heightened emotional states in music/dance events, a characteristic feature of *son* and salsa performance.

Several ethnomusicologists have however presented arguments that suggest dance grooves may play a central role in engendering a sense of community and can strengthen emotional bonds within groups (Stokes 2010; Washburne 1998; Zagorski-Thomas 2007). Of these, Washburne's 1998 study of groove in salsa shares many similarities with the present study. In his article, *Play it "Con Filin!": The Swing and Sxpression of Salsa*, he combines micro-timing data and Keil's theory of participatory discrepancies and groove to develop the argument that:

> There is a desire to achieve a state that Turner describes as communitas...this requires every member of a group to work as a unit to achieve an optimum performance. A coming together of feels to groove with the hippest of swing. Personally, when I cannot restrain the smile emerging on my face, nor still my body, I know it's swinging...these moments are why I continue to play and I am not alone in these sentiments. When a band is swinging particularly well, the musicians will talk about the event for days (Washburne 1998: 181).

Washburne's arguments are of particular relevance to my investigations. Similar to Doffman, he proposes that effective grooves are reliant upon synchronous joint action and interaction, but intriguingly he also suggests that there is an essential connection between the collective groove of salsa performance, feelings of embodied movement, heightened emotional states and a sense of community – as described by Turner's (1969) theory of 'communitas'. Washburne's arguments are interesting when placed alongside those of the scholars cited in the previous section, who suggest that early incarnations of *son* and salsa were integral to community life. Moreover, given the international presence of *son* and particularly salsa, it is intriguing to speculate that perhaps the groove and aesthetics of modern *son* and salsa have retained some of that community spirit, that power to move bodies, provoke heightened emotional states and develop a sense of collectivity through participatory music making and dance.

The brief overview of the scholarly work presented in this section suggests that to understand fully the nature of groove in Cuban dance music a multi-dimensional approach is needed, one that considers theories and methods from a number of academic disciplines. The more psychologically-informed arguments of Keller, Zbikowski and Doffman highlight the importance of intersubjectively shared knowledge in groove production, whilst Washburne's more ethnomusicologically-informed arguments focus on the socio-cultural dimensions of groove and the connections between these aspects of groove and communal sentiments. From a methodological point of view, the approach used by Doffman and Washburne, which integrates timing and ethnographic data, is one that has the potential to provide intriguing new perspectives on groove in Cuban dance music. By documenting the ways in which enculturated musicians talk about groove and correlating these verbalisations with the timing data gathered in real-world performance situations, it is possible to gain fresh insights into the intricate socio-cultural and musical practices that contribute to the characteristic groove of *son* and salsa.

Theoretical Perspectives and Methods

As well as presenting approaches and methods that are relevant to the study of groove in Cuban dance musics, the overview of extant studies presented above also suggests that a number of theoretical perspectives hold some relevance to my investigations. While a more detailed discussion is provided in future chapters, this section provides an overview of these theoretical and methodological perspectives and discusses the relevance they hold to the current study.

The first of these is Charles Keil's theory of 'participatory discrepancies' (PD) and groove. Keil theorises that groove is founded not upon exact synchrony, but is the result of the nuanced and idiosyncratic timing discrepancies between interacting musicians (Keil and Feld 1994). Keil also stresses the connection between groove-based musics and the social aspects of collective music making, arguing that the groove has the power to invite participation and evoke a spontaneous sense of energy, euphoria and connectedness between participants. Although Keil himself provides no empirical evidence to bolster his theorisations, his ideas have informed a number of studies that make use of timing data to explore the discrepancies of groove in a range of musics (e.g. Alén 1995; Butterfield 2010; Gerischer 2006; Prögler 1995; Washburne 1998). Keil's ideas and those of PD-inspired researchers are of some relevance to my investigations as the grooves found in *son* and salsa performances are characterised by a similar sense of participation, collective euphoria and energy. And, as will become apparent in future chapters, one important aspect of *son* and salsa grooves is the dynamic tensions created, as Keil suggests, by the 'out-of-syncness' between interacting musicians.

The second theory considered is entrainment, a concept widely used in mathematics, physics, biology and social sciences to describe the universal tendency of rhythmic entities within biological, mechanical and social systems to interact and achieve a synchronous and harmonious state (Pikovsky et al 2003; Strogatz 2003; Strogatz and

Stewart 1993). Studies that have applied entrainment theory to aspects of music performance are very rare (see however Keller 2008; Lucas et al 2011) and aside from a handful of studies entrainment theory has seen little use in the study of groove (see however Butterfield 2010; Doffman 2008). However, the entrainment model does have a clear correlation with Keil's theory of groove: the timing discrepancies that result from the socio-musical processes between musicians can be understood a s musicians "being entrained at the preferred degree of synchronicity" (Clayton et al 2005: 36). In future chapters, I explore the idea that socio-musical entrainment is a key process that underlies the rhythmic and synchronous timing relationships between grooving musicians and consider the role musical entrainment plays in evoking a sense of participation, collectivity and euphoria in Cuban music/dance events.

Another facet of socio-musical interaction is described by the notion of intersubjectivity, a term used in a range of academic disciplines including phenomenology, sociology and psychology to describe the shared meanings and understandings constructed by people during everyday social communication and interaction (Trevarthen and Aitken 2001). I use the theory of intersubjectivity as an explanatory principle and examine the role it plays in effective ensemble interaction and the production of a unified group aesthetic that is considerably more than the sum of the individual parts. Related to the idea of intersubjectivity are notions of conceptual and cultural models, terms that have been developed in disciplines such as cognitive psychology and cognitive anthropology in order to explain how individuals construct personalised and shared knowledge in relation to a particular socio-cultural context (D'Andrade 1987; Kessing 1987; Shore 1996; Strauss and Quinn 1997). Drawing on these concepts, I develop the argument that cultural models within the Cuban musical tradition (e.g. the *clave*) form an important knowledge base that facilitates effective musical interaction, that guides aesthetic judgements and that connects musicians through shared knowledge of the musical tradition.

The final major theoretical strand that holds considerable relevance to the present study is Durkheim's concept of 'collective effervescence' (Durkheim 1968 [1915]) and Turner's concept of 'communitas' (Turner 1969). These theorisations primarily focus on the heightened emotional states, increased energy and communal feelings experienced by participants through close interaction during intense social gatherings. Borrowing these theories, I explore the notion that performers of Cuban musics experience similar emotional states and communal sentiments during effective-collective groove production. Furthermore, I examine how these collectivist sentiments are derived from the socio-musical interactions between musicians and the synchronicity between the musicians' groove and audience participation through physical movement and dance.

To integrate these different theoretical perspectives into a coherent whole, it is necessary to use a methodology that combines ethnographic methods (semi-structured interviews and participant-observational fieldwork) with empirical techniques (micro-timing and statistical analysis). An ethnographic approach provides important insights into how musicians talk about the shared cultural knowledge, socio-musical processes and emotional aspects of collective groove production, as well as providing a means of engaging with musicians within the socio-cultural context under investigation. By contrast, when examining the expressive timing relationships and when looking for instances of musical entrainment, an empirical approach is vital as it facilitates the precise measurement of micro-interactions between musicians as they work together to produce a groove during performance. By thoughtfully combining contextually rich ethnographic data with timing data taken from performances recorded in situ, I aim to build up a detailed picture of the knowledge, aesthetics and dynamic interactive processes that shape collective groove production in contemporary *son* and salsa performance.

To my knowledge, no single study has combined the theories and methods outlined here and applied them to the analysis of groove in Cuban dance musics. While the current

study can be most readily aligned with the ethnomusicological approach to groove advocated by Keil, by drawing on perspectives from a number of disciplines I hope to shed new light on and extend his theorisations and to fill some of the gaps in the ethnomusicological literature with regard to the investigation of groove in Cuban dance musics. Furthermore, it is hoped that the approach adopted here will contribute to the broader study of groove and musical entrainment within the field of ethnomusicology (Clayton et al 2005) and perhaps to the wider understanding of African-American groove-based musical traditions such as jazz and funk.

Research Questions and Aims

As the preceding discussions suggest, the origins of the research questions within this study lie in my performance experiences playing *son* and salsa. These questions have been shaped and formalised by my fieldwork in Cuba and the UK, as well as through the consideration of perspectives presented in the literature on Cuban dance musics and groove. These different perspectives have led to the formulation of one overarching research question: what is the nature of a successful groove in *son* and salsa performance?

When this broad question is considered in relation to the literature outlined above, several specific questions become apparent. First, what is the role of intersubjectively shared cultural knowledge (e.g. the *clave* and archetypal *tumbaos*) in groove production in *son* and salsa performance? Second, what part do these rhythmic features play in generating the characteristic sense of motion, energy and drive in *son* and salsa performance? Third, what are the expressive timing relationships between musicians, how do they shape the aesthetics and groove of *son* and salsa, and how are they influenced by instrumental roles within the ensemble? Fourth, what role does entrainment between musicians play in the generation of an effective-collective groove? Fifth, what is the relationship between the *son-montuno* performance structure, tempo and groove? Lastly, what is the relationship

between groove, physical movement, dance and sensations of heightened emotions and increased energy typically experienced in *son* and salsa performances? How do these musical practices and aesthetics combine to generate a sense of community, collectivity and participation in music/dance events?

In attempting to answer these questions, I do not focus extensively on some of the perspectives that typically concern scholars of Cuban dance music. These include the relationship between music performance and Cuban political ideology and systems (Manuel 1987; Moore 2006; Robbins 1989, 1991), issues of race, religion and cultural identity in contemporary Afro-Cuban musics (see Froelicher 2005 and Perna 2006 on *timba* and Baker 2005, 2006 and Fernandes 2003a, 2003b, West-Durán 2004 on Cuban rap), the history and development of Cuban musical forms (Borbolla 1980; Carpentier 2001; Manuel 1991b; Moore 2010; Rodríguez 1998; Roy 2002; Sublette 2004) and the relationship between Cuban music and other Caribbean and US musical forms (Boggs 1992; Fernandez 2006; Leymarie 2002; Manuel 1995; Waxer 2002a). Although some of these perspectives are touched upon in forthcoming discussions and have been extremely useful in informing my broader understanding of Cuban musical performance, the primary aim of this study is to detail the shared cultural knowledge, aesthetics and socio-musical processes that shape effective-collective groove production in *son* and salsa performance.

Overview of Chapters

This chapter has provided an introduction to the experiences, literary and theoretical perspectives, and methods and aims that form the contextual framework within which this study proceeds. This final section provides an organisational overview of forthcoming chapters.

In chapter 2, I introduce the data collection and investigative methods and techniques used in this study. Specifically, this chapter details how ethnographic and empirical

methods are blended to form a single coherent methodology, the ways in which participants were contacted, the locations of data collection and the audio-visual equipment used to record live performances. Furthermore, this chapter sets out the techniques and software applications used to analyse video, audio and interview data, and describes the criteria by which ensembles and performance excerpts were selected for analysis. The chapter then goes on to describe the groups, repertoire and performances from which the timing data was extracted for subsequent analyses.

Having laid out the research methodology in chapter 2, chapter 3 draws on interview data and findings from related studies to explore the multifaceted nature of the aesthetics, rhythmic sensibilities and participatory attitudes to music-making that characterise the performance of Cuban dance musics. Specifically, I present the argument that the *sabor* aesthetic is characterised by four interrelated components: how individuals within the ensemble are required to perform with a sense of purpose, energy and rhythmic assertion; how an individual's musical sensibilities and attitudes contribute to the ensemble sound; the role of intersubjectively shared knowledge in effective ensemble interaction; and concepts of race, ethnic and class identity. Finally, the relationship between the *sabor* aesthetic and working-class community practices and attitudes is explored.

In chapter 4, I explore further the notion of intersubjectivity by introducing the theoretical idea of cultural models, or the widely shared understandings that people make use of to function effectively in a community or group. Theoretical approaches to cultural models are considered before I examine the *clave*: a key rhythmic pattern and important and pervasive cultural model within the Cuban musical tradition. Various technical aspects of the *clave* are then examined: its structure; its stylistic associations; the notions of playing 'in-clave' and 'cruzado'; and the *clave*'s relationship to the underlying tactus or pulse. Finally, arguments are presented which suggest that the *clave* embodies a tension-and-

release dynamic, a dynamic that may contribute to the rhythmic energy, perceived sense of motion and participatory nature of Cuban and Cuban-related grooves.

In chapter 5, I explore the multiple meanings typically attached to the term 'groove' and look at one specific dimension of groove in detail: the rhythmic patterns, played within the rhythm section, that define the rhythmic-harmonic framework of *son* and salsa. Drawing on discussions presented in chapter 4, I also consider an additional layer of rhythmic-harmonic tension and release that might exist in certain key rhythm section patterns or *tumbaos*. Lastly, I look at the dynamic interplay between these *tumbao* patterns and the influence this interplay might have on successful groove production in *son* and salsa styles.

In chapters 6, 7 and 8, timing and interview data are integrated to paint a detailed picture of the timing relationships that underpin rhythm section groove production in three different group performances. Chapter 6 looks at the concept of entrainment and Keil's theory of groove and examines some relevant applications of these theories in different disciplines. The discussion then outlines the connections between entrainment and groove, and considers the findings and approaches used in related micro-timing studies. Finally, micro-timing data, taken from three performance excerpts is examined alongside musicians' verbal accounts, in order to discover how groove is influenced by roles within the rhythm section and how these roles influence the moment-to-moment temporal fluctuation and interactions between rhythm section musicians.

In chapter 7, I explore how groove might be shaped by the phase relationships between rhythm section players, i.e. the degree of synchronous alignment in instrumental parts. By detailing relative phase across three group performances and by examining changes in phase relationships at one specific cadential point within the rhythmic-harmonic framework of *son* and salsa, I explore how real-time phase adjustment and synchronous

interactions within the rhythm section might add an additional layer of dynamic energy and sense of propulsion to the collective groove.

In chapter 8, I investigate the relationship between groove and group tempo. Three dimensions of group tempo are explored: variation in overall tempo; within-tune temporal variation; and the relationship between tempo variation and the *son-montuno* performance structure. Finally, this chapter combines micro-timing data from the previous two chapters and temporal macro-timing data to look for instances of rhythm section synchronisation and entrainment, and considers the role these processes play in shaping Cuban aesthetics and groove.

Before concluding my research findings in chapter 10, chapter 9 discusses the emotional experiences reported by performers of Cuban dance music during successful groove production. This chapter discusses Émile Durkheim's concept of 'collective effervescence' and Victor Turner's related concept of 'communitas' and looks at findings from extant studies that have applied these theorisations to the investigation of collaborative music performance and collective groove production. This chapter then draws on ethnographic accounts and findings presented in previous chapters, to look at how intersubjectively shared knowledge, musical interaction, timing relationships and the process of entrainment might engender moments of musical effervescence and feelings of communitas. Finally, this chapter examines how audience participation through physical movement and dance might contribute to the sense of collective energy, the heightened emotional experiences of participants and Csikszentmihalyi's 'flow' states.

Chapter 2

Research Methodology

The discussion in the preceding chapter revealed how shared knowledge, socio-musical practices and aesthetics within the Cuban musical tradition might contribute to effective-collective groove production in Cuban dance music. These can be summarised as follows: the widespread use of the *clave* and the role it plays in providing a rhythmic, structural and aesthetic guide during performance; the use of certain key rhythmic-harmonic ostinati or *tumbaos* played within the rhythm section; the timekeeping/improvisation roles played within the rhythm section; the use of the *son-montuno* performance structure; an emphasis on dynamic and synchronous rhythmic interaction between musicians and dancers; and, an aesthetic that embodies a vibrancy and energy that has an ability to generate heightened emotional states, a sense of participation and possesses the power to bring people together in celebratory music and dance.

Furthermore, in the previous chapter I argued that to investigate fully these facets of Cuban dance grooves, it is necessary to use a methodology that integrates ethnographic and empirical approaches. The purpose of this chapter is to add more flesh to this argument by detailing the data collection and analytical techniques that form the backbone of the research methodology. The discussion of this methodology proceeds in four main stages: the first section provides an overview of the ethnographic and empirical research methods used; the second section details the preparation for fieldwork and techniques for data collection; section three considers the methods and audio/visual equipment used when conducting fieldwork; and section four outlines the methods, techniques and software used for post-fieldwork data analysis. The final sections provide an overview of the groups, songs and performance excerpts selected for data analyses and summarises the research methodology.

1) Methods of Investigation: An Overview

There were two primary methods of investigation: firstly, an ethnographic approach involving semi-structured interviews with musicians, singers, dancers, musicologists and educationalists; and secondly, an empirical approach involving the timing analysis of audio recordings of live performances. The overarching aim was to combine these two methods to provide a more complete picture of performer interaction and collective groove production than either method would in isolation.

The ethnographic strand was similar to the approach used by ethnomusicologists such as Paul Berliner (1994) and Ingrid Monson (1996), who used insightful and comprehensive ethnographic methodologies when researching interaction, improvisation and groove in jazz. Specifically, Berliner and Monson documented – using a combination of interviews, participant observation and detailed musical analysis – the ways in which professional musicians acquire and develop their musical skills, and how they use those skills in the creation of an interactive groove. Such an approach has the advantage of providing detailed and authoritative knowledge of the cultural, social and musical processes at work behind effective groove production and of the rhythmic-harmonic framework within which groove production takes place. As highlighted in chapter 1, many scholars of Cuban dance music have suggested that it is precisely these types of processes and rhythmic-harmonic features that are central to the characteristic groove of Cuban dance music, and in particular the dynamical groove of *son* and salsa styles.

The second, more empirical methodological strand was similar to the approach used by musicologists such as Clarke (2004), Clayton et al (2005) and Rink (2002), which advocates the use of specialist software to assist in measuring the expressive timing components of real-time performances, including tempo fluctuation, and phase and period relationships between performers. More specifically, the approach used by Clarke and Rink focuses on the use of statistical techniques to measure the temporal and dynamical

variations in Western Classical piano performances and they demonstrate how this approach has been used by music psychologists to provide "a 'window' onto hidden cognitive processes in music" (Clarke 2004: 77). The empirical procedures promoted by Clayton et al demonstrate how performance micro-timing data can be integrated with ethnomusicological methods to effectively analyse the interactions and entrainment processes between performers, particularly through the interpretation of phase relationships between instrumentalists (the fine-grained adjustments in alignment between corresponding music events). From the perspective of the current study, these approaches are intriguing as they suggest that similar methods might be used to measure precisely the real-time rhythm interactions and temporal fluctuations between Cuban musicians as they produce a groove during performance. As the current study shows, micro-timing analyses, particularly when the data is gathered in real-world performance situations (and interpreted accurately), can be used to make inferences about the subtle and expressive timing nuances that might underlie the participatory nature of groove (Keil and Feld 1994).

Both approaches, ethnographic and empirical, have potential limitations. Ethnography, and the qualitative data that it typically produces, is heavily dependent on the interpretative processes of the researcher. Specifically, it relies on the ability of the researcher to write about their experiences and select appropriate and insightful interview excerpts (Davidson 2004). An empirical approach, and the associated quantitative data that it produces, typically suffers from a loss of realism or ecological validity by failing to capture the social, cultural and emotional dimension of human musical experience, especially when the data is gathered in unnatural circumstances such as an experimental, laboratory setting (Windsor 2004).

Therefore, the aim of the current investigation is to marry these two approaches into a single coherent methodology that might, a) build on the strengths of the two approaches

by combining socio-culturally rich ethnographic data with the 'hard' empirical timing data, b) address the limitations associated with an empirical approach by recording live performances in situ, c) diminish the limitations associated with ethnography by placing equal emphasis on empirical timing data, and d) create a mutually informative dialogue between the ethnographic and the empirical approaches.

The methodology used in this investigation, whilst not widespread in usage, is not unique. Several music researchers have used an approach that combines ethnographic and empirical methods. For instance, Clayton et al (2005) have championed the use of such an approach in the study of musical entrainment (see chapter 6) and Lucas et al (2011) have fruitfully applied ethnographic and empirical techniques to the study of inter-group entrainment in Afro-Brazilian Congado music. Likewise, Gerischer (2006) successfully combined ethnography with micro-rhythmic analysis in the study of Brazilian dance grooves, Washbourne (1998) combined musical transcription, the analysis of micro-timing data and ethnography in his article on the swing and expression of *salsa* and Doffman (2008) explored the notion of groove in jazz using a combination of micro-timing analyses of live performances and in-depth interviews with the performing musicians.

Alén's (1995) analysis of the timing variations of *tumba francesa* toques (basic rhythmic cells) also has many parallels with the approach used in the current research. Alén produced a detailed study of the exact temporal relationships between various rhythmic motifs that are continuously repeated in a Cuban *tumba francesa* drum ensemble. Using average timing values, and measurements of the degree of variance from these averages, he determined the relationship between notated rhythms and their actual performance. Although Alén did not specifically address the notion of groove, he used statistical techniques to measure the micro-timing variations that arguably underlie groove production, coupled with detailed knowledge of the rhythmic framework within which these

timing variations take place. This type of statistical analysis forms another key methodological component employed in current research (see chapter 6, 7 and 8).

The above-mentioned studies have a slightly different emphasis, and as will become apparent in forthcoming chapters, the methodology and findings presented by these scholars all hold some relevance to the present investigation. However, to my knowledge, no single study has fully integrated empirical and ethnographic methods in the study of the groove in popular Cuban dance music. By making use of timing data of recordings of real-world performances and in-depth interviews with musicians within the Cuban musical tradition, the methodology used in this investigation aims to provide a detailed picture of how musicians interact during groove production, the aesthetic judgements they make during these interactions and how these judgements are influenced by some of the socio-cultural processes and archetypal rhythmic-harmonic and structural features that characterise Cuban dance music. Furthermore, whilst forthcoming chapters draw on methods and approaches used in ethnomusicology and empirical musicology to enrich the study of groove in Cuban dance music, it is hoped that the approach used here will in turn contribute to the study of groove in the wider research community.

2) Pre-fieldwork Preparation

Pilot Study

Due to the complexity of data collection and combining multiple analysis techniques, it was essential to road test these methods through a pilot study. To validate data collection procedures, in November 2008 I recorded London based group, Riamba, during a performance at a salsa venue in Newbury, West Berkshire, UK. I had been the bass player in this group for several years and was therefore familiar with the musical material (a mixture of Cuban *son* and salsa), the other members of the group and the performance venue. This level of familiarity was advantageous because it allowed me to bypass the

often-lengthy process of contacting musicians and venues to arrange recording permissions.

Each instrument (timbales, electric bass, electric piano, trumpet and vocals) was recorded on separate audio tracks on a Korg D888 Multi-track hard disk recorder using a combination of microphones (for vocal, trumpet and timbales) and direct input (bass and piano). The entire two-hour performance was recorded and later imported into ProTools for mixing and editing. All the musicians were subsequently interviewed between March and April 2009. Audio and video recordings were made of the interviews using an M-Audio MicroTrack 24/96 portable digital recorder and Sony PD-170 video camera. All interviews were later transcribed for analysis.

To validate data analysis procedures, a one-minute segment from a *montuno* section was selected from the Riamba performance. The bass, piano and *clave* tracks were then exported from ProTools into Praat, and then into a spreadsheet model for tempo and phase relationship analysis and graphing. Full details of these procedures are given in forthcoming sections.

The pilot study was invaluable preparation for the main period of research for at least the following reasons: first, to gain experience of using audio and video recording equipment; second, to understand the limitations of being both recordist and performer at the same time; third, to learn how to use the music editing and data analysis software; fourth, to learn how to accurately interpret and present micro-timing data; fifth, to gain experience of how to effectively integrate timing and interview data; and last, to refine interview questions and techniques.

Participant Observation

Participant observation has long been an indispensible part of the ethnomusicologist's toolkit as it helps build a more complete picture of the musical system being studied (Nettl 1983: 247-258). Scholars have also proposed that investigating music through participant observation can lead to a level of personal experience that directly informs interview questions and typically places the researcher in a position "to observe the actions of other individuals, and to set a picture of what people actually do alongside what they say they do" (Stock 2004: 23).

The majority of my participatory experiences were as a bass player, gained through over ten years of performing Cuban and Cuban-related musical styles in London and other parts of the UK. As scholars such as Nettl and Stock suggest, these experiences proved invaluable, informing the research process in several ways. Firstly, I had made many contacts with performers of Cuban music, many of whom contributed to this study. Secondly, I was very familiar with many of the key aspects of the Cuban musical system such as typical rhythmic-harmonic patterns played within the rhythm section, performance structures such as the *son-montuno* and standard repertoire within the Cuban *son* and *salsa* traditions. This was advantageous when speaking to musicians, forming an important 'common ground' during interviews. Thirdly, I had a good understanding of the world professional musicians inhabit, and therefore generally knew how to initiate a fruitful dialogue, and to avoid lines of questioning that would be most likely to annoy them. Perhaps most importantly however I had direct multi-sensory experiences of Cuban groove production and how it feels to interact with other rhythm section players and to 'lock in' to produce an effective-collective groove.

Whilst I had considerable experience as a bass player, I realised in the early stages of this study that learning the basics of Cuban percussion was fundamental to understanding how the different rhythmic strands interlock and to understanding fully the underlying

rhythmic feel of Cuban music. Therefore, in July 2006, I attended a week-long Afro-Cuban *batá* course at London's School of Oriental and African Studies (SOAS), in June 2008 I attended a week-long Cuban big band workshop, also at SOAS, and in February 2009 I studied percussion with Cuban *son* band Sierra Maestra in Havana. Additionally, throughout the main period of research (September 2008 to December 2011) I continued to work in London and the surrounding area performing Cuban music as a bass player and percussionist. This amounted to around 100 participant observation sessions. Thoughts, observations, insights and revelations, as well as date, times and locations from these sessions were recorded in a field journal and research database. These records of my experiences formed an important and invaluable component of this study, helping to piece together a more comprehensive understanding of the Cuban aesthetic system.

Spanish

To conduct interviews with Cuban musicians in Spain and Cuba, I needed at least a basic level of Spanish. With this objective in mind I started to learn Spanish in July 2004. Through a mixture of distance learning courses, evening classes and informal practice with musicians from Spain, Cuba and Latin America, I was linguistically proficient enough to make my questions understood, comprehend the majority of responses and to interact socially with Cubans. The principal limitation of not being a fluent Spanish speaker was that some interviews were, at times, a little less spontaneous and interactive than I would have liked. However, all interview questions were translated in advance with the help of a native Spanish speaker and all interviews were recorded for subsequent translation (39% of interviews were in Spanish). Therefore, I feel that my lack of fluent Spanish did not hamper the research process.

Seeking and Contacting Participants

Initial participants were musicians who I had formed connections with through my own professional work in London and participant observations in Cuba. As research progressed I used these initial connections as a base from which to seek further participants: musicians would recommend other musicians, singers and dancers and they might provide further contacts and so on. This process lead to interviews being conducted in London, Spain and Havana with participants being drawn from a wide range of backgrounds and experiences (see later section, 'interviews and interviewees'). While personal recommendation was the principal method of contact, another important source of participant-contact came through websites, local events listings and through speaking to musicians at performances.

Cuba presented numerous challenges when contacting groups for recording sessions. Firstly, it is extremely difficult to prearrange recording sessions before arriving in Cuba as emails are rarely replied to, the postal system in Cuba is notoriously unreliable and using mobile phones can be both an expensive and unpredictable means of communication. Secondly, there is an understandable level of suspicion surrounding unsolicited foreign researchers looking to make professional multi-track recordings of Cuban groups[6]. Further, due to the complexities of the Cuban administration system in obtaining official recording permission and the expense of transporting three recordists and equipment to and around Cuba, it became obvious that this was not a viable option for a small-scale research project. Therefore, no multi-track recordings of performances were made in Cuba (see 'conducting fieldwork' section for details of recordings).

[6] There is a long history in Cuba of issues of copyright and foreign (mainly US) record company involvement in alleged issues of unpaid royalties to Cuban artists dating from the early twentieth century. These suspicions were brought to the fore once again during the 1990s with increased

Criterion for Participation

As one strand of this research aimed to construct a complete picture of the how individuals interact to produce a collective groove, the primary criterion for selecting interviewees was that they were members of the ensembles that had agreed to a live recording. Aside from favouring those participants, interviewees were invited from as wide a range as possible in terms of age, experience, fame, gender and styles performed, including professional and semi-professional musicians, singers, dancers, musicologists, educators and performers of Cuban music. The benefit of such a broad criterion was that it provided differing perspectives: working musicians tended to provide very practical information regarding playing technique and would demonstrate key rhythmic patterns and how they interlock with other instruments in the rhythm section; educators and musicologists spoke in detail about the nature and history of Cuban musical culture; and dancers provided a more embodied perspective.

The criteria for selecting ensembles was perhaps more narrow, as groups were selected based on the style of Cuban dance music performed. As the primary interest was in *son* and *salsa*, those performance styles were favoured. However, trying to categorise neatly Cuban dance musics is often hazardous, as styles are often highly inter-related and terms like *son* often denote large generic and stylistic complexes that contain many interrelated sub-genres (Acosta et al 2005). Further complications arise as performers of Cuban music (in Cuba and elsewhere) often play a mixture of styles (e.g. *son*, *rumba*, *latin jazz*) in a single performance and many of the key rhythmic and melodic patterns used appear in several genres. Therefore, ensembles were considered for participation if a significant proportion of their performance material could be broadly placed in the *son* and salsa styles, and the material contained key musical features under investigation such as the typical rhythmic-harmonic *tumbaos*.

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foreign record company involvement in the Buena Vista Social Club project and as a result of market-driven policy making during the special period (see Finn 2009; Moore 2006; Perna 2005).

3) Conducting Fieldwork

Performances

Four different groups were recorded in total (some more then once) between July 2009 and July 2010. All group recordings were conducted in or near London with either London based musicians of varying ethnic backgrounds (English, Spanish, Cuban and Latin American), Cuban musicians living in London or Cuban groups who were on tour in the UK. Performance venues varied, ranging from *salsa* clubs, universities, through to concert halls. Audio and video recordings were made of the entire performances by myself with the assistance of one or two additional recordists, depending on the circumstances and performance venue.

Audio Recording

Performances were recorded either on an eight-track Korg D888 or into ProTools on a laptop via a Digidesign 002 rack-mounted audio interface. The exact configuration of microphones and direct outputs from the amplifiers varied from performance to performance, depending on the instrumental format of the group and the nature of the venue's sound equipment. For example, in some venues with a larger PA system or where the stage was not directly accessible during the performance, direct line outs for all instruments were taken from the venue's mixing desk. In smaller venues a typical set up would be: direct input for the bass, piano, tres and guitars; AKG D112 for the bass drum; AKG C414s for the timbales; a pair of Neumann KM148s for overheads or overall stereo recording; and a mixture of AKG C1000s and Shure SM57s and SM58s for percussion, trumpet and vocals.

Direct input was favoured to achieve the level of track separation needed for later empirical timing analysis. When microphones were used they were placed as close to

sound source as possible with the same objective in mind. All recordings were later transferred onto a larger ProTools workstation for mixing and editing.

Video Recording

Typically, one Sony PD 170 camera was placed in a central position in front of the group to capture musicians' movements, gestures and interactions. On two performances, a second Sanyo Xacti CG10 camera was used to focus on those musicians who were at the back of the stage and were therefore obscured from the view of the front camera. Both cameras were tripod mounted, in fixed positions (central, or stage left/right) and recorded an overall audio mix via a mounted rifle (Sony) or internal microphone (Sanyo).

The recording medium was mini DVCam tapes for the Sony PD 170 and SD card for the Sanyo Xacti. Subsequently, video recordings were imported into Avid video editing software. Once in Avid recordings were edited and transferred to DVD. This was useful for two reasons: firstly, copies of the performance could then be sent to musicians for their own promotional purposes, as was often requested; and secondly, performances can be viewed on any platform, which is advantageous when viewing performances during interviews, on different computers and in different locations.

Interviews and Interviewees

Interviews were conducted in the UK (London and Milton Keynes), Galicia in Northern Spain (Vigo, Pontevedra, Pazos de Borden and Santiago de Compostela) and Havana, Cuba, between March 2009 and August 2010. Specific interview locations varied depending on the country and participant availability. They ranged from musicians' homes to universities, through to cafés, hotel rooms and a tour van. 36 interviews were conducted in total: 24 in the UK, 7 in Spain, 4 in Cuba and 1 via email. The majority of the interviewees were Cuban, however ethnicity varied: 21 were Cuban, 8 were British, 1 was Spanish, 1 Brazilian, 1 Columbian, 1 British-Chinese and 1 Cuban-Argentinean. 18

interviews were conducted in English, 14 in Spanish and 4 in a combination of the two languages. All interviews were recorded on a digital portable recorder with built in microphone, a Zoom H4n Handy Recorder or M-Audio MicroTrack 24/96, in .wav or .mp3 formats respectively. Interviews varied in length from 20 to 72 minutes depending on the time available and how much interviewees had to contribute. The average interview duration was 45m 50s. See appendix A for further details of interviews and interviewees.

All interviews were semi-structured: I determined the types of questions and directed the general flow of conversation, however, within that structure musicians were allowed the freedom to explore more tangential responses and interject anecdotal evidence. Another feature of some interviews was to show musicians video material of their own performance. This allowed me to target questions towards particularly interesting aspects of the performance (e.g. heightened interaction, audience participation and structural transitions) and draw them back to a specific moment in time to enquire about the thought processes and musicality that underpinned their actions. All the questions were broadly the same for each interview with minor adjustments made for different instruments played and individual circumstances. For full details of question types and interview structure, see appendix B.

I was the principal interviewer, however, my colleague Graciela Rodriguez, who arranged the interviews with Cubans living in Spain, conducted two of the interviews whilst I operated the audio and video recording equipment as these interviewees had requested copies of video-recorded interviews for their own promotional purposes. Graciela followed the same prearranged line of questioning and interview structure as I did.

4) Post-fieldwork Data Analysis

Audio Analysis

Due to the vast amount of audio data generated by performance recordings (around 12 hours), it was not possible to analyse it in its entirety. The first step was, therefore, to select appropriate excerpts for analysis based on the following criteria:

- All excerpts could be broadly placed in the *son* and *salsa* styles – in order to ensure a degree of stylistic consistency.
- Excerpts spanned the structural transition from *son* to *montuno.* Given the wide spread use of this structural feature is many Cuban music/dance complexes and its association with an increase in tempo and change of feel and aesthetic across this transition, this was a key feature of Cuban dance music performance (see chapter 1).
- All *montuno* grooves feature the typical rhythmic-harmonic anticipated bass and piano/*tres tumbaos* or variations thereof, and other archetypal rhythmic-harmonic patterns.
- Performance tempi were broadly similar, again to ensure a degree of consistency across the excerpts.
- The excerpts feature moments of heightened interaction between group members (e.g. increased body movement, gestural communication and eye contact) which suggests that they are working interactively to produce a collective groove.
- All excerpts, particularly in the more dance-orientated *montuno* section, feature moments of euphoria, suggesting that participants are having a good time, the groove is successful and there is a sense that the performance is in 'full swing'.

Through a process of repeatedly viewing performance video footage, a list of excerpts began to emerge that met these criteria. From an initial list of around twenty excerpts, a

second list was complied – again through repeated viewing of video footage – that most robustly matched the above criteria. This list represented my judgements and choices. Therefore, to obtain a more rounded view, excerpts considered for analysis were shown to the featured musicians (where practical and usually at the end of an interview) to gain a sense of what they felt were the moments where the groove was working well and the performance was at its most effective. This was an extremely informative and important exercise as it helped engage performers with the selection process and counteract researcher bias (Davidson 2004: 65). As a result of this process, three excerpts were decided upon for timing analysis (see the forthcoming section, 'introduction to performance excerpts' for details).

Once the excerpts were decided upon, transcription of the musical elements of interest (bass, piano/*tres* and a percussion part) was the next step. This was initially done by hand and later recreated in Sibelius, thus allowing me to check the accuracy of the transcription and to see precisely how each rhythmic-harmonic element relates to the other elements in the time-line (see appendix C for full excerpt transcriptions).

With transcriptions complete, each relevant track was exported from ProTools into Praat[7] – a software tool that facilitates the viewing, marking and labelling of sound events as they occur in performance time. The process of accurately identifying and marking the start point of sound events (known as 'onset detection' in auditory processing literature) is central to producing consistent and accurate timing data for future analysis, but is a process that can be problematic. The main issues with regard to onset detection are differentiation between physical and perceptual onset (when the note actually occurs as opposed to when it is perceived by the listener) and the related phenomena of different 'rise times' (the level of attack) associated with different types of instruments – percussive

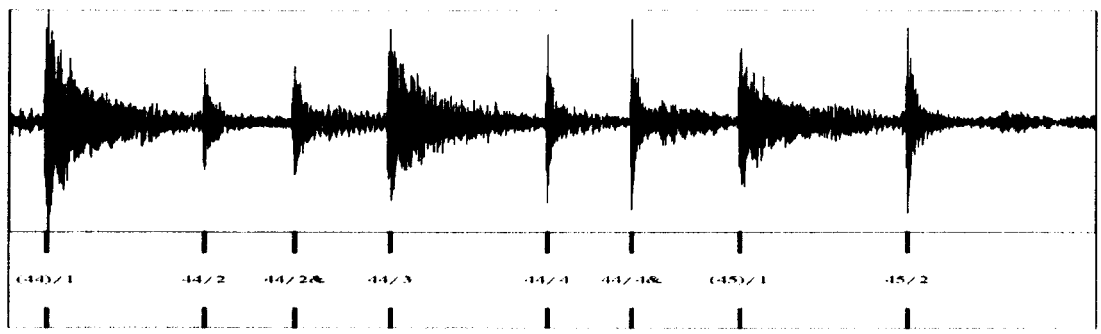
[7] Praat was developed by Dutch academics at the Institute of Phonetic Sciences, University of Amsterdam, to aid linguistic analysis, but has more recently been used in (ethno)musicological research (see Clayton et al 2005 and Cooper and Sapiro 2006).

instruments have a more acute attack than woodwind or bowed instruments, for instance (see Aschersleben 2002; Duxbury et al 2003; Gordon 1987; and McAdams et al 2004, and others).

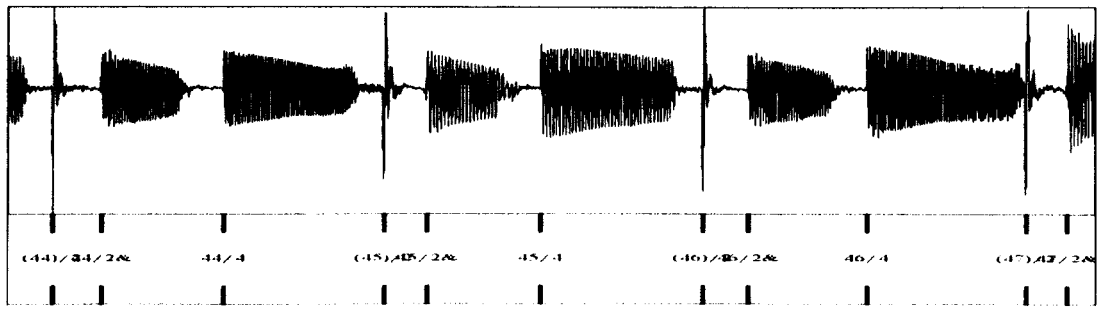
However, these issues were not insurmountable within the remit of this investigation as: a) onsets were marked manually in order to avoid the inaccuracies sometimes associated with automatic onset detection programs; b) the physical onsets, not the perceptual onsets, were marked as this adhered more closely to the aim of using empirical analysis to illuminate the subtle and expressive timing nuances that underlie real-time collective groove production; c) the instruments under analysis (percussion, electric bass and electric piano/acoustic guitar) have relatively rapid rise times; and, d) performers of Cuban music tend to play in a very percussive manner, regardless of the instrument being played, which produces well defined onsets with acute rise times.

Figure 2.1a-c – Auditory Profiles and Praat Onset Markers for Bell, Electric Bass and Electric Piano

A – Bell, recorded with a Shure SM 57 microphone



B – Electric bass, recorded direct from the amplifier



C – Electric piano, recorded direct from the keyboard

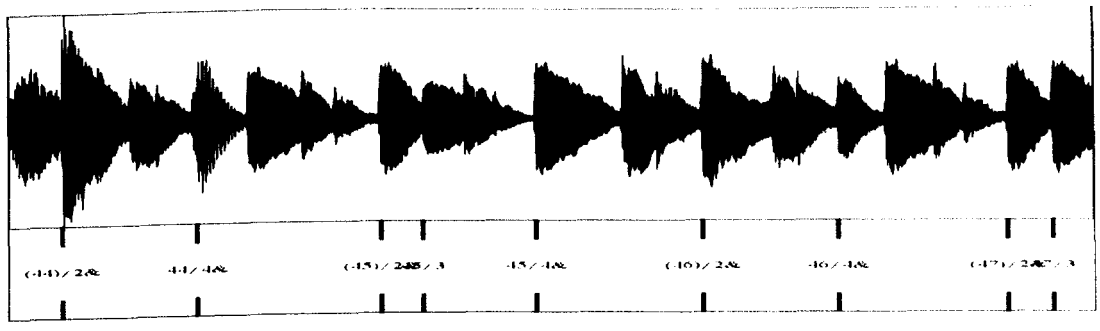


Figure 2.1a-c shows a snapshot of the auditory profiles and Praat onset markers for the bell, bass and piano for one of the excerpts used for timing analysis in chapters 6 to 8. As can be seen in these screenshots, while each instrument has a slightly different auditory profile, they all have similar acute rise times, making onset detection and marking relatively unambiguous and unproblematic. These screenshots also show the onset labelling system used. For example, in figure 2.1a the first label, (44)/1 indicates that this onset occurred at bar 44, beat 1 and the third label, 44/2&, indicates the onset occurred in the same bar but on the up beat of 2.

Once the detected onsets were judged accurate and consistent across the range of sound events the labelled timing data was saved as text files from Praat and imported into an Excel spreadsheet for analysing, processing and graphing. This involved the use of statistical techniques, such as calculations of the range, mean and standard deviation, as well as the use of methods borrowed from circular statistics to measure the moment-to-moment rhythmic variance of each instrument (instantaneous tempo), group tempo and the relative phase relationships between rhythm section instrumentalists. Precise details of these statistical techniques are explained as they are introduced in chapters 6 and 8.

Video Analysis

While video recordings of performances were a vital component of this investigation, the footage largely played a supporting role to the ethnographic and empirical data analysis. Video extracts were used in interviews to help interviewees to recall specific moments during performance, to formulate and direct interview questions and were used extensively in the process of excerpt selection. The video data was not used for detailed behavioural and gestural analysis or motion tracking (Clayton 2007; Clayton et al 2005: 46-47).

In the early stages of this study, I experimented with using The Observer Video-Pro, observational analysis software that allows the assignment of key codes to gestural events and the extraction of movement timing data. This analysis was conducted with the objective of comparing audio and video timing data in order to paint a broader picture of musical interaction. Initial trials produced some promising results, but a thorough processing and interpretation of video and audio data would have required a great deal of time and delayed research completion, so this line of investigation was not perused further. Such an approach would however form the basis of an interesting future study.

Interview Analysis and Formatting

The 36 interviews that were conducted in the course of this research (totalling around 24 hours of recorded material) were all subsequently transcribed into MS Word. Initially, all interviews were transcribed in the language in which the interview was conducted (English or Spanish) and those in Spanish were then translated into English, with the original version being retained for later verification. I transcribed and translated all of the English interviews and some of the Spanish interviews myself. However, a colleague, Graciela Rodriguez, who is a native Spanish and fluent English speaker resident in the UK, transcribed and translated the vast majority of those conducted in Spanish. Transcripts were verbatim and followed a simplified version of a notation system developed by Gail

Jefferson (Atkinson and Hertiage 1984, 1999), which has become a standard transcription system in conversation analysis (Davidson 2009: 42). All quotes taken from interviews conducted in Spanish are presented in English throughout forthcoming chapters with the original Spanish versions provided in appendix D. My approach has been to present quotes verbatim, lightly editing them in cases where there was a lack of clarity. This involved removing repetition and conversational fillers and the insertion of descriptions within square brackets, usually to explain gestural communication evident in interviews or to clarify terminology used.

Once transcribed and translated, the next step was to indentify broad themes that could be used to categorise interviewee responses. These themes were initially based on the categories used to organise the interview questions (see appendix B) and were as follows: interviewee background, concept of groove, groove in performance, movement and visual information, music and dance and social factors. However, as a result of repeated readings of transcripts and through a process of colour coding related discourse, alternative themes and sub-themes began to emerge that subsequently formed the structural basis of this thesis.

The process of identifying themes and sub-themes was not, however, divorced from other analytical processes at work in different facets of this research. This process was informed by (and interconnected to) the aims of the research, the themes developed from literature reviews, the audio and video data analysis, the outcomes of the pilot study, and by my participant observation and fieldwork experiences. Adopting such an approach has the potential advantage of allowing the researcher to move back and forth across different data sets until a meaningful and coherent account emerges (Aronson 1994). This is analogous with the "framework approach" that advocates the use of iterative, non-linear interconnected stages of interview analysis to build a conceptual "scaffold that guides the analysis" (Smith and Firth 2011: 60). Such an approach seeks to overcome the

misinterpretation problems often associated with interview transcription analysis (Monson 1996: 21).

5) Introduction to Performance Excerpts

As a result of the iterative selection process detailed earlier (see 'audio analysis' section), three performance excerpts by three different ensembles were decided upon for subsequent timing analysis. For each ensemble, a short excerpt of around one minute was taken from the *montuno* section. These excerpts form the quantitative basis of chapters 6 and 7, which considers two micro-timing perspectives: instantaneous tempo profiles and the relative phase relationships between three instruments within the rhythm section (bell, bass and piano/guitar). As Chapter 8 takes a more macro-level perspective, detailing group tempo for the same three ensembles, the timing data used was taken from the entire length of the same songs from which the short micro-timing excerpts were taken. The following is a brief introduction to the three ensembles, recording sessions and songs that contributed the performance timing data for both micro and macro analyses.

Excerpt One: Riamba, 'El Cuarto de Tula'

The first excerpt is taken from the Cuban tune 'El Cuarto de Tula' (composed by Sergio Siaba) as performed by London band group Riamba. The performance was recorded at the Café in the Crypt, Trafalgar Square, London, on the Wednesday 1 July 2009. The entire performance comprised two 50 minute sets performed between 8.00pm – 10.00pm, with El Cuarto de Tula being performed toward the end of the first 50 minute set. The entire song lasted for 7m and 43s.

The instrumental line up was voice, trumpet, electric piano, electric bass, timbales and congas. The electric instruments (piano and bass) were recorded direct from the amplifiers whilst the acoustic instruments were recorded with microphones. The musicians were of multi-ethnic origin: 4 English (trumpet, piano, bass and timbales); 1 Spanish

(voice); and 1 Columbian (congas). Riamba, in various line-ups, has over 10 years of experience playing *salsa* in the UK, at a variety of professional engagements ranging from *salsa* venues, through to function work. The musicians in the current line-up had been together for around 5 years at the time of recording.

El Cuarto de Tula featured on the Buena Vista Social Club recording and has become part of the standard repertoire of many groups playing Cuban and Cuban related music in London. I have also heard it performed by numerous groups in Havana, suggesting that it may have become part of the repertoire of groups in Cuba as well. It is in the *son* style, follows the *son montuno* performance structure, is in 4/4 metre, the rhythm section is playing typical rhythmic-harmonic *tumbaos*, and the Riamba version is performed slightly faster than the recorded version at a tempo of around 113 bpm.

Excerpt Two: Havana Club Descarga, 'Muñeca'

This excerpt is taken from the *salsa* standard 'Muñeca', composed by New York *salsero* Eddie Palmieri. The performance was recorded at the Kings Head, Crouch End, London, on the Monday 26 July 2010. The entire performance comprised two one-hour sets performed between 9.00pm – 11.30pm, with Muñeca being performed toward the beginning of the second set. The entire song lasted for 7m and 14s.

The instrumental line up was voice, trumpet, sax, electric piano, electric bass, *clave*, bongo/bell and congas. Again, the electric instruments (piano and bass) were recorded direct from the amplifiers whilst the acoustic instruments were recorded with microphones. The musicians were of multi-ethnic origin: 3 English (trumpet, sax and piano), 1 Cuban (percussion) and the remaining 4 were of Latin American origin (mainly Columbian).

Unlike Riamba, the Havana Club Descarga group is not of fixed line-up. As the name suggests ('descarga' means jam session) at venues like the Kings Head, musicians are invited to play *son* and *salsa* tunes, usually with a core rhythm section line up to accompany *salsa* dancers. These musicians range from professional through to semi-professional and amateur, and could therefore comprise musicians from a range of backgrounds and musical experiences, and often do. However, they are usually organised by professional freelance musicians who play regularly in the UK and who form the backbone of these sessions. One such group of core musicians performed the version of Muñeca featured in this study. Muñeca is a *salsa* tune that borrows heavily from *son*, is in 4/4 metre, follows the *son-montuno* structure, the rhythm section is playing typical rhythmic-harmonic *tumbaos*, and it was performed at around 100 bpm.

Excerpt Three: Asere, 'Habanera'

The third excerpt is taken from 'Habanera' as performed by Cuban *son* group Asere. The performance was recorded at the Open University music research studio, Milton Keynes, on the Friday 23 July 2010. The entire performance was one 40 minute set, performed between 4.00pm – 4.40pm. Habanera was the last song in the set, lasting 6m and 48s.

The instrumental line up was voice, trumpet, acoustic guitar, Spanish guitar, electric bass, bongo/bell and congas. The bass and guitars were recorded direct, via a DI box, the remaining instruments recorded with microphones. All the musicians in Asere are Cuban and are based in Havana.

Asere formed in the 1990s with the objective of playing traditional *son* music with a contemporary feel. They have toured extensively over the past ten years and in 2006, they started working on a collaborative project with jazz drumming legend Billy Cobham. Their performance of Habanera, a song from one of their earlier albums, is, like the previous excerpts, in the *son* style, in 4/4 metre, follows the *son-montuno* structure, and

the rhythm section is playing typical rhythmic-harmonic *tumbaos*. The performance tempo was around 106 bpm. Unlike the previous groups, Asere did not perform in a typical venue setting as they were booked to perform a 40-minute set as part of a daylong session consisting of interviews and instrumental performance workshops at the Open University. However, there was a small audience present during the live recording session to provide appreciative feedback. As I had recorded a previous live performance with Asere in London (which was not used for analysis due to technical issues) I did not feel that this setting comprised the live feel of the performance.

6) Summary

This chapter has detailed the data collection and investigative methods and techniques used in this study. The main objective is to blend ethnographic methods such as semi-structured interviews and participant observation, with empirical methods such as timing and statistical analysis, to form a single cohesive and comprehensive research methodology.

Such a methodology produces a rich set of qualitative and quantitative data that facilitates the detailed examination of the shared knowledge, socio-musical practices and aesthetics that underpin real-time groove production in Cuban dance musics. Qualitative data is particularly useful for interpreting the socio-cultural, emotional and aesthetic factors that have an influence on groove production processes, whilst quantitative data can be used to interpret the subtle and expressive timing nuances that underlie real-time effective-collective groove production. Both sets of data, qualitative and quantitative, form the basis of the following chapters.

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Chapter 3

The Sabor Aesthetic

The aim of this chapter is to discuss how performers of Cuban music characterise the musical aesthetics and sensibilities that run through Cuban dance music and to outline some of the socio-musical processes and attitudes that shape its performance. After a brief outline of the terminology used by Cuban musicians when discussing musical aesthetics, four main interrelated perspectives are considered. First, *sabor* as an individual aesthetic is discussed, exploring the attitudes and emotional states of musicians and how these states might contribute to the energy and participatory nature of the performance. Second, *sabor* is explored from a collectivist perspective and how individuals that comprise the ensemble work collaboratively and interact to generate a collective groove with energy and drive. Third, the role of intersubjectively shared knowledge in collective musical action is discussed. Lastly, issues of race, ethnicity, identity and a sense of participation are considered. These final two sections discuss how these notions might contribute to musical aesthetics and groove, and explore the connections between notions of *sabor* and the music-making practices and attitudes of working-class Cuban communities.

Fieldwork experiences and qualitative data, taken from interviews with performers of Cuban dance music, form the basis of the forthcoming discussion. All interview extracts are presented in English, with references to the original Spanish versions given were appropriate (see appendix D).

Terminology

When the music embodies a sense of drive and energy, the musicians are freely interacting and there is a sense of euphoria in the room, Cuban musicians say *la música*

tiene sabor, which roughly translates as, the music has 'taste' or 'flavour'. During the course of interviews with Cuban musicians, other terms came to light that were akin to *sabor.* They include: yunfa, aché, iré, bomba, sentimiento, corazón, tumbao, guajeo, manana, afinque and swing. Many of these are highly vernacular in nature and their precise socio-linguistic origin needs to be determined by a separate, dedicated and in-depth study, which is not the focus here. However, to provide the reader with a broad linguistic framework in which to situate future interview extracts, a brief outline of these terms is necessary.

These terms, like the music they are used to describe, reflect Cuban dance music's African and Spanish heritage. To play music with yunfa, aché or iré, for instance, means to play with energy, vigour and strength. According to one Cuban *son* musician I spoke to in Spain, these terms originate from African-Yoruban religious contexts:

> There is a thing that you can hear...inside the popular argot of Cuba. The Cuban musicians call it, this has yunfa. Hey, dude, you have iré, aché, these are mystic words of Yoruba, of ritual chants of Yoruba, you know? This group has aché, has power, has yunfa, has swing (Willy Mondeja, interview[3.1], 23/2/10).

Scholar Katherine Hagedorn (2001) reinforces this viewpoint. In her study of the spiritual power in Afro-Cuban *santería* performance, she writes that "aché is a central concept in Yoruba cosmology that has been transferred intact to the Cuban practice of Santeria...which, in a performance context, can be understood as the power to make things happen" (Hagedorn 2001: 118)[8].

[8] See also Megenney (1983) and Miller (2005) for a discussion of African words in common usage in Cuba and other parts of Latin America.

By contrast, terms such as bomba, sentimiento and corazón are of Spanish origin and are used to describe music played with fire, feeling and heart. Also of Spanish origin, the meaning of the terms montuno, guajeo and tumbao are twofold: they can refer to repeated rhythmic-harmonic patterns played on any instrument, most typically instruments in the rhythm section (bass, percussion, *tres*, piano etc.), but can also refer to the flavour or spirit of music. Cuban and salsa musicians also use the term 'swing' to describe the flavour or feel of music (Washburne 1998: 181). This is a term that has associations with a style of early jazz, popular in the US in the 1930s, but more broadly can refer to the "essential rhythmic aspect of jazz performance" in different jazz idioms (Berliner 1994: 122, 785). It is likely that the term entered the vocabulary of Cuban musicians during the 1930s and 1940s, a period that saw considerable cross-fertilisation between Cuban dance music and jazz (Fernandez 2006; Roy 2002; Sublette 2004).

As will become apparent in forthcoming discussions, despite being rooted in different aspects of Cuban music's cultural heritage, in contemporary usage the above-mentioned terms are used interchangeably by many musicians, and in many different musical contexts. Sabor, however, perhaps more than any other term, has become synonymous with Cuban identity and a Cuban sense of musicality and aesthetic (Fernandez 2006: 42-57). Further afield, Manuel argues, it has come to denote the "intense drive and exuberance" of Latin American dance music (Manuel 1998: 143).

Sabor as an Individual Aesthetic

While learning percussion with Cuban *son* group Sierra Maestra in Havana, I was told in an introductory session that one of the most important aspects of Cuban musical performance is to play with feeling, heart, soul and desire. As I had been a performing musician all my adult life, I thought I had a handle on what that might mean. For me it conjured up notions of 'play it like you mean it', 'play with conviction' etc. as well as more pragmatic concerns such as 'increased concentration and effort' and 'digging into the

instrument'. Although these ideas were relevant, as percussion lessons continued, I began to understand what this might mean in a Cuban musical context. During one ensemble performance, I was instructed by my tutor – through a combination of words, facial expressions and a gesturally communicative clenched fist and raised forearm – to play 'más fuerte': literally 'strongly' but in a musical context also louder, intensely and with a sense of purpose. In a subsequent conga lesson, Sierra Maestra's singer and percussionist told me that, "you can't be timid when you play this music, it doesn't work. It requires energy and rhythmic assertiveness" (Jesus Bello, personal communication, 17/2/09).

On both of these occasions, and many like them, my lack of strength and energy was partly due to pragmatic concerns – a lapse of concentration, poor instrumental technique, not being completely familiar with the rhythmic patterns, fatigue (congas are an extremely physically demanding instrument) and so on – but there were also concerns of a more aesthetic nature. These included achieving the desired rhythmic feel, approaching the instrument with a certain attitude and playing with Cuban musical sensibilities and flavour. To try to flesh out these rather abstract notions I asked musicians for their thoughts on performing with *sabor*. One Cuban percussionist, who performed *son*, salsa and *rumba* styles, said that:

> Sabor and swing is the taste with which you project yourself, and the projection you have with the instrument. The improvisation part has to be an improvisation that you feel, you know? I see swing like that, the way of enjoying what you do, and it has to be valid and it has to reach the people. To me that's what swing is, It has swing! I really enjoy it, I enjoy what I do (Vicente Areucibia, interview[3.2], 23/7/10).

For Vicente Areucibia, *sabor* is related to playing with appropriate or authentic musical sensibilities ("it has to be valid") and is concerned with enjoying the performance and projecting that sense of enjoyment to the fellow performers. Playing with *sabor*, however, also involves developing a connection between the performer and their audience, as suggested by the following quote from a Cuban *son* guitarist:

> There is a way of interpreting music and to reach people, and that is to play with swing and sabor. When music is not interpreted with sabor – call it sabor, manana or corazón – when a person doesn't play with sabor, that information doesn't reach the people, the audience who are listening. That is important, that is the reason of being a musician, it must transmit, music is transmitting. And when you play with swing that touches people, people enjoy that a lot (Adolfo González, interview[3.3], 23/7/10).

Adolfo González highlights the importance of the performer-audience connection and the fundamental role that this connection plays in Cuban musical sensibilities. Relating these ideas to my experiences during percussion lessons in Havana, I was taught to perform instrumental techniques and key rhythmic patterns with Cuban musical sensibilities and aesthetics: that is, to play with rhythmic conviction and energy and how to communicate these aesthetic qualities to fellow performers and the audience members. In short, I was taught how to play with *sabor*.

The reason why playing with *sabor* is so important in Cuban musical performance is multifaceted and can be traced to its West African heritage. Firstly, Cuban dance music, like many related West African musical forms, is polyrhythmic in nature, containing multiple and contrasting rhythmic lines that are interwoven and that are defined with reference to one other (Arom 1989). Therefore, it is essential that musicians perform with a certain degree of strength and rhythmic self-assertion because, by doing so, they then

provide clearly defined rhythmic reference points that help to bind the contrasting rhythmic strands together to form a holistic sound. Secondly, Cuban dance musics, and certain West African musical forms, often have a dense rhythmic texture, thus playing with percussive clarity and rhythmic assertion helps to give an individual rhythmic line a more pronounced presence within this texture. Thirdly, by playing with *sabor,* as Vicente Areucibia points out, musicians project a feeling of enjoyment to fellow performers and audience members alike, a feeling that communicates their participatory intentions and invites participation from others.

Several scholars argue that it is these rhythmic sensibilities and aesthetics that lie at the heart of the participatory nature of many West African musical experiences; for them, injecting an essential "physical and aesthetic energy" (Cudjoe 153: 288) and "rhythmic potency" (Locke 1982: 244) adds to the "social cohesion" of community dance events (Chernoff 1991: 1100). Similar participatory rhythmic sensibilities and aesthetics are evident in many Cuban music/dance events. For example, the interactive polyrhythmic *batá* conversations play a crucial role in providing the dynamic rhythmic energy and drive that helps to bring down the *orisha* in *santería* possession ceremonies (see chapter 1). And Daniel (1995: 110) argues that in Afro-Cuban *rumba* performance the sensuous rhythmic interactions between percussionists and dancers project a possession-like level of impulsive energy, intensity and joy, a heightened level of dynamic energy and emotion that produces a surge of power helping to drive the entire performance and to invite participation from audience members.

To summarise, when an individual plays with *sabor*, the term signifies very practical aspects of Cuban musical performance such as instrumental technique and sound production and projection, but it also refers to less tangible aspects of musicianship: playing with certain sensibilities and emotional states, and playing with a participatory attitude. Another key perspective of the *sabor* aesthetic, as the following interview quote

from a Cuban *son* guitarist and *tresero* illustrates, is the notion that *sabor* is not only an individual aesthetic, but also a resultant property of the collaborative actions of participants within the group:

> Individually, you tell the musician that he has sabor or he plays with sabor, and you usually call it this, the musician plays with swing because he reaches places that people like...but also it's when a group of people are playing and they are connected and have a certain sonority, and there is a good vibe, a good energy in that moment (Alejandro Albar, interview[3.4], 23/7/10).

The proposition that *sabor* is a collective aesthetic generated by collaborative action, as suggested by Alejandro Albar, will be explored in more detail next.

Sabor as a Collective Aesthetic Ideal

The notion of a collective emergent property as a result of interactive and synchronous ensemble action has been explored in a number of non-musical situations. For example, social psychologists Kerry Marsh and her colleagues explore the idea that during everyday social interaction, individuals act as a 'social unit', that is, as a dynamic, collective perception-action system that has "...unique properties distinct from the properties of the individuals involved" (Marsh et al 2006: 21). They use the analogy of a "social quilt" "that is more than a collection of individual patches" (2006: 30) to summarise this collectivist perspective. Similarly, the related theory of 'distributed cognition' (Hutchins 1995, 2006) postulates that in collaborative Micronesian ship navigation the structure of cyclical navigational procedures emerges from the interactions of individuals involved, and in team sports, an emphasis is placed on the notions of 'synergy' or group potential, which is greater than the sum of members' individual potentials (Syer 1991).

Musicians can also endeavour to generate such a collective spirit (Goodman 2002; Maduell and Wing 2007) and "ensemble musicians usually aim to interact in a manner conducive to producing a coherent musical entity" (Keller 2008: 206). Many musicians interviewed in the course of the present study spoke of *sabor* as a collective aesthetic, generated by a similar sense of ensemble spirit. One Cuban pianist and guitarist I spoke to in London likened the musical collective to an organic body whose soul was the sum of the connected parts:

> I think that individually you can be a very good musician but once you start to play in a band you have to see that like a whole body. The same way that the heart doesn't work without the kidneys, the lungs etc...because the soul is the foundation of everything. It's not only about your individual skills, it's about the connection, the chemistry that you can create within other members within the band...it's everything, it's a whole package (Alina Carmona, interview, 20/8/10).

Alina Carmona's comment that "it's about the connection, the chemistry that you can create within other members within the band...it's everything, it's a whole package" suggests that the *sabor* aesthetic, like Marsh's 'social quilt' perspective or 'synergy' in sports, is the sum of the individual parts, generated by the interactive behaviours of ensemble members.

Although collectivist sensibilities are desirable, another important aspect of the *sabor* aesthetic is that performing musicians strike a balance between the individual and the collective. On the one hand, the Cuban musical aesthetic is centred on the cohesive expressions of performing participants, whilst on the other hand spontaneity and individualistic expression through variation on standard patterns and improvisation have always been prominent musical features of many Cuban dance musics (Fernandez 2006; Leymarie 2002; Roy 2002; Sublette 2004). When I asked a classically trained English jazz

pianist about his experiences of developing the required aesthetic in Cuban musical performance, he spoke of this collective-individual dynamic, likening it to another expressive artist form:

> Somehow you are just part of, you know, it was a kind of a Pointillist picture like a Seurat[9] or something, you are just one of the dots amongst it and the overall picture is complete. The piano always playing on the off beats...it's that willingness to simply step back from that magnetic pull to the on-beats. Always playing off. And I think for me that was the measure of success; if I could just allow myself to sit there and not try and fit in and try and let it develop by itself. So that was the challenge and I suppose the great beauty and the reward when you felt that you could actually just sit, firmly and squarely (Richard Allain, interview, 10/4/09).

He went on to explain how Cuban musical performance differed from his experiences of performing in other styles, particularly chamber music. This time he used a tapestry metaphor:

> If you play chamber music, as a piano player you always play the bass and you always play the chords, and quite often you play the tune. And quite often, if you are accompanying a singer, you might just move into their parts a little bit...no one is playing your part as a piano player in this kind of music [Cuban dance music] they are simply doing their own thing. It's like a kind of tapestry: pull out the red thread and it's just a whole red thread by itself, that could be a bass line, but by the time you see it in a tapestry as a tiny colour...trying to keep that stable, trying to

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[9] Pointillism is a form of post-impressionistic painting in which separate tiny dots of primary colours are used to generate a complete picture. Georges Seurat is a prominent painter in the Pointilliste style.

keep that voice. It's a great challenge but you know when it glues, when it fits (Richard Allain, interview, 10/4/09).

Richard Allain makes some pertinent observations about the rhythmic framework within which Cuban dance music is performed and of the importance of synchronous timing and rhythmic interaction within that framework. Firstly, when he speaks of being "one of the dots" in a painting or being a "whole red thread" within a "tapestry", he is metaphorically referring to his experiences of effectively weaving a single syncopated piano *tumbao* pattern into a larger polyrhythmic framework. Secondly, when he speaks of trying to "simply step back from that magnetic pull to the on-beats", "to just sit" with the other instruments and of keeping the *tumbao* "stable" he alludes to the dynamic synchronous and interactive timing relationships that underpin the *sabor* aesthetic. Thirdly, when he speaks of the challenge to "not try and fit in" and of "trying to keep that voice", he was referring to the individual-collective dynamic that is inherent within the polyrhythmic framework.

These experiences highlight the fundamental relationship between the *sabor* aesthetic in Cuban dance music and notions of groove. Specifically, they underscore the role of key rhythmic patterns within the rhythm section (in this instance the piano *tumbao*) and how the instrumentalist is required to execute these patterns with the 'correct' timing in order to produce a groove that has *sabor*. Furthermore, these experiences suggest that when *tumbaos* are played with *sabor* this adds a sense of dynamic and, to quote Richard Allain, "magnetic pull" to the collective groove. In order to explore these ideas further, it is instructive to consider Cuba's socio-musical heritage, particularly those from West Africa. Many scholars argue that the collectivist aesthetics of certain West African musical traditions embody an ethic of "mutual responsibility" and "equal opportunity" (Waterman 1990a: 375), and value "active participation in group life" and a "community experience"

that "depends to some extent on both individual and collective effort" (Nketia 1975: 50. Also see Arom 1991; Chernoff 1991; Jones 1954; Waterman 1990b).

Likewise, Chernoff (1979) argues that West African rhythmic sensibilities also reflect this dynamic, collectivist ethic. According to these sensibilities, a single repeated rhythmic element played in isolation is uninteresting and lacks meaning because it is stripped of its musical context, analogous to listening to one side of a conversation. Only when each rhythm is heard in an ensemble context, where it is placed in a dialogical relationship with other complementary rhythmic elements, does the entire conversation makes sense, the rhythmic Gestalt is realised and each element has contextual meaning (Chernoff 1979: 158). However, when a rhythmic element engages in an interactive dialogue with other elements, its meaning, like a conversational dialogue between two people, is often subject to influence, alteration and adaptation. It is in such a rhythmic dialogue that the possibilities and limits of individual expression are suggested and defined. As John Chernoff explains:

> A drummer will cut across the other rhythms, but at the same time he cannot step too far outside a responsive relationship without destroying the basic character of the beat; since drummers depend on each other to stay on the beat, he might even get everybody so confused that they would have to stop playing and start again. If the drummer strays too far from his rhythm, he will misaccentuate or overemphasize the beat and thus ruin the intriguing balance, and if he moves into too close synchrony with another drum, he negates the potential effect of both rhythms. The rhythms must be clearly distinguishable from each other because one rhythm determines the way we can apprehend another rhythm. Changing the part of one drum in a composition, therefore, would alter the effect of the total rhythmic fabric (Chernoff 1979: 58).

As Chernoff's argument suggests, the rhythmic framework within which conversational dialogues are performed mediates the dynamic between the collective sound and the artistic expressions of the individual: "if the drummer strays too far from his rhythm" he may "ruin the intriguing balance" or risk "destroying the basic character of the beat". Additionally, like Richard Allain's earlier description of his experiences playing Cuban dance music, Chernoff also underscores the importance of timing and "synchrony" during these conversational dialogues between performers and the sense of dynamic this adds to the collective groove. As detailed in the previous section, individuals must bring a certain physical and aesthetic energy, personal expressiveness and sense of purpose to the performance, but of equal importance, according to Chernoff (1979: 169-170), is the power and vitality derived from rhythmic conflict and negotiation between individuals as they interact within a tightly organised rhythmic framework. Active ensemble participation and interaction, according to Chernoff, is "powerful precisely because people are affected and moved" (Chernoff 1979: 169) by these negotiations. Without this dynamic polyrhythmic music could seem uninspired and aesthetic unpleasing, or to quote a Nigerian musician, "beautiful-but dull" (Chernoff 1979: 58).

Many parallels can be drawn between the rhythmic principles and sensibilities found in West African musical forms and those found in Cuban dance music. For instance, Fernandez (2006) argues that, similar to the improvisatory role played by *iyá* drum in *santería* and the *quinto* drum in *rumba* ensembles, an accomplished *bongosero* within a *son* ensemble must play a dual role, providing steady, reliable and supportive rhythmic accompaniment but also engaging in "conversations" with the *sonero* (singer) and other instrumentalists. When these improvisations are executed with skill and taste, according to Fernandez, they add energy and a feeling of "forward propulsion" to the performance (Fernandez 2006: 28). It appears that this energy and sense of forward motion, which has always been of central importance to the groove of Cuban dance music (see chapter 1), is partly derived from this dynamic individual-collective aesthetic.

Interestingly, from the perspective of the current study, several authors have argued that it is this energy and vitality, embodied in West African rhythmic principles and sensibilities, which forms the basis of the groove in many Afro-Caribbean musical forms such as merengue, reggae, soca, calypso (Dudley 1996; Floyd 1999; Johnson and Chernoff 1991) and salsa (Washburne 1997) as well as certain African-American musical forms such as jazz (Iyer 2002; Pressing 2002; Rahn 1996; Salamone 1988;) and funk (Danielsen 2006; Wilson 1974). Many of the key rhythmic principles discussed by these authors such as the *clave* (see chapter 4) and dynamic rhythmic interaction within the ensemble form the backbone of the forthcoming chapters on groove (see chapters 5 and 8).

In sum, just as an individual musician brings his or her own personal aesthetic expressions and energy to the ensemble, the *sabor* aesthetic can also denote a unified collective sound, a sound that is born from the dynamic, rhythmic interactions and improvisatory conversations between those individuals within the ensemble. The polyrhythmic framework in which these conversations take place can be conceived as functioning as a regulator to these dynamic interactions: too great or inappropriate deviation from the prescribed pattern and the rhythmic Gestalt has less focus and the flavour is lost, too little and the music looses its communicative energy and potency, and can become over-simplified, over-repetitive, or redundant. Through these interactive processes, the musical ensemble, like the 'social unit' or highly synchronised sports team, generates and projects an effective and unified aesthetic that is both representative of and contingent upon its individual parts.

Undoubtedly, for a group of musicians to communicate and interact effectively, it is essential that they also share some knowledge of the musical tradition within which these interactive processes unfold. This notion is explored further in the next section.

Sabor and the Ensemble: Intersubjectively Shared Knowledge

Scholars in a number of different academic disciplines have highlighted the importance of shared knowledge, presuppositions and conventions in effective everyday social interaction. For example, eminent sociologist Erving Goffman writes that:

> Each participant enters a social situation carrying an already established biography of prior dealings with the other participants – or at least with participants of their kind; and enters also with a vast array of cultural assumptions presumed to be shared (Goffman 1983: 4).

And the related notion of 'intersubjectivity', a term used in philosophy, psychology, sociology and anthropology, broadly describes a condition somewhere between subjectivity and objectivity, but more specifically can refer to shared meanings and understandings constructed by people through interactions in everyday social situations (Trevarthen and Aitken 2001). Several researchers have proposed that all human interaction is influenced by intersubjectively shared knowledge and experience. Such influences manifest themselves in the type of language used (everyday and task-specific) and in communicative bodily actions and gestures (Kendon 2004, McNeill 1992), as well the manner in which we interact with the objects in the physical environment (Hutchins 1995, 2006; Goodwin 2006). The related theory of 'common ground' also suggests that mutual knowledge openly shared by a group or "the open stockpile of shared presumption" (Enfield 2006: 399) plays a fundamental role in communication economy and successful joint action (Becker 1974; Hanks 2006).

Ethnomusicologists have highlighted the importance of intersubjectively shared cultural knowledge in musical joint action: for John Blacking, the performance of "polyrhythmic structures in Venda music were political acts, in which people could receive and feel

personal power through a shared, culturally prescribed action" (Blacking 1995: 176-177). Similarly, Ingrid Monson's notion of 'intermusicality' suggests that for musicians to be able to converse intuitively during performance they must immerse themselves in the musical tradition and develop, over a period of years, the ability to play, recognise and respond to rhythms, melodies, harmonic sequences and the gestural ideas of fellow performers (Monson 1996: 97-132). Of the common practice of quoting melodic phrases from other tunes in jazz improvisation and interaction, Monson writes that they are "the most obvious examples of the thick web of intertextual and intermusical associations to which knowledgeable performers and listeners react" (Monson 1996: 127).

On a similar tack, Benjamin Brinner makes a strong connection between musical competence and intersubjectivity in Javanese gamelan ensemble performance. He suggests that mature and competent musicians must hold knowledge of both repertoire and interactive procedures (cues, responses, and other forms of communication) as defined by the musical tradition. "A musical tradition resides in the minds of the bearers of that tradition...as an aggregate of musical knowledge, skills, and ways of making music which are "bundled" together by a group of musicians, enabling them to interact within their community, however that might be constituted" (Brinner 1995: 321).

For Cuban musicians to interact effectively within the ensemble and produce the desired *sabor* aesthetic they must also hold shared knowledge of their rich and varied musical tradition. As one Cuban bass player pointed out when asked about *sabor* in *son* performance:

> You have to put sabor and swing, and bomba in the music with respect to the style. You cannot put another style in, for example, in son you can't put guaguancó or cha-cha-chá. You have to respect the style (Michel Salazar, interview, 23/7/10).

By learning traditional repertory and performing with respect to the style, a musician is revealing more than just knowledge of the musical tradition. As Michel Salazar's quote suggests, a musician is also revealing important aspects of the aesthetic system by which these musical elements are interpreted and evaluated, and how the inappropriate use of musical materials, presented during ensemble performance would result in an aesthetic that had the 'wrong' flavour. In order to make such judgements, shared knowledge is of central importance. As Ingrid Monson argues, for any musical material to be interpreted as "meaningful and actionable" within a given aesthetic system the "community of interpreters (which includes both performers and audience)" must hold musical knowledge "that is at least partially shared" (Monson 1996: 127).

In the previous section, it was argued that *sabor* is also a collective aesthetic, generated by and representative of the musical interactions between co-performers within the ensemble. A Cuban trumpet player, now resident in Spain, reinforced this argument and also spoke of the importance of a common musical language and a shared sense of musical intuition that facilitates effective-collective musical interaction:

> That [sabor] for me is the ensemble, the pasting or filling among all the group members. When all of them speak the same language, the same interpretation, when they know how to listen to each other. It's around that. It's actually when there is a good harmony, but not musical harmony, but harmony within the group. When there is a lot of musical maturity, so when you have that, when there are good musicians, when the music flows well, sometimes with a simple look we know what's going to happen, we listen to the other one, we know the direction he's going to take, we see it coming, for example, a guitar solo, or a brass riff, or a break, and the cadence, the intuition of the musicians makes you play very well. Sometimes you don't need a lot of rehearsals, no. Because one thing is the rehearsal, one thing is the preparation, and another thing is the musical intuition,

> the musical maturity, each one's interpretation. And there it's when that ensemble falls into place (Victor Ruano, interview[3.5], 20/2/10).

Victor Ruano makes some interesting points. He suggests that *sabor* is related to harmonious ensemble interaction, in which the key elements are "musical maturity" and "musical intuition", that the musicians must "speak the same language, the same interpretation" and that musicians must "know how to listen to each other" in order to make "the music flow well". Victor Ruano's assertions suggest that as well as possessing individual musical skills and knowledge of the musical tradition, for musicians to function effectively within the ensemble they must possess shared knowledge of both the musical tradition and knowledge of how to interact intuitively with fellow co-performers.

Assuming musicians have the required level of musical knowledge and interactive skills to produce the required aesthetic, the question remains as to how musical ensembles might develop knowledge and meanings that are shared amongst performers and their audiences. In other words, what are the underlying mechanisms and processes that generate a sense of sharedness? Musicologist Peter Keller offers some insight on this topic; drawing on social cognition theory, he argues that active participation, intense attentional focus, and affective and adaptive timing are key processes. To engage in this form of meaningful and purposeful interaction, according to Keller, "requires each performer to be sensitive to the subjective states expressed by his or her co-performers", enabling separate instrumental parts to gel together to "form an auditory Gestalt" and aiding the development a shared cohesive and meaningful representation of an ideal musical sound (Keller 2008: 206). Furthermore, Keller argues that by exercising the human predisposition for intersubjectivity within the social world, active participation and interaction within the musical ensemble can synchronise not only their musical sounds but also musicians' bodily movements and mental states as well.

The evidence presented in this section suggests that intersubjectively shared knowledge of the musical tradition and knowledge of how to interact effectively with co-performers within that tradition, plays a central role in the generation of the collective *sabor* aesthetic. Musical intersubjectivity, like intersubjectivity in social situations, is constructed through active and purposeful interaction between participants, mediated by adaptive and synchronous timing processes. How these interactive and synchronous timing processes relate to the notion of groove and audience participation in Cuban dance music is investigated further throughout forthcoming chapters. The following section, however, considers another important aspect of *sabor*, the cultural context within which this aesthetic is intertwined.

Sabor and Cuban Concepts of Race, Ethnicity and Identity

An array of complex political, environmental, economic, historical and socio-cultural factors have shaped the aesthetic of Cuban and Cuban-related music and dance forms (Boggs 1992; Carpentier 2001; Leymarie 2002; 1991b; Moore 2006; Orovio 2004; Rodríguez 1998; Roy 2002; Sublette 2004). When asked to elaborate on the concept of *sabor*, several Cuban musicians directly related it to Cuba's rich and varied heritage and spoke of the historical and socio-cultural factors that have influenced the development of Cuban dance music. For instance, a Cuban pianist, music teacher and musicologist that I spoke to in Spain, said that:

> It's the race...the best thing that could happen was that the Spanish arrived, and brought the Africans, the blacks, and after that the Chinese came, then the English...all that fusion of racial mixes came. So, I think that the sabor is like a mixture of musical condiments...what happens is that a specific sabor is in what you mix, not in the mix as such, but what do you mix. And I think that in Cuba, its sabor is in what was mixed, what was fused, what was taken from each one. It wasn't taken in a defined way...many topics have been created, that the Africans

> brought the rhythm, the Spanish the melodies and all that, but you listen to a rumba flamenca and it's amazing, in fact, it's the more related jazz genre...because it has a certain richness, it's alive. So I think that is the sabor. It is the mixture and *what* you mix. Above all the spontaneity, what happens spontaneously (Imilka Fernández de Posada, interview[3.6], 23/2/10).

Imilka Fernandez de Posada's emphasis on "what" is retained in the 'spontaneous' interaction between the diverse musical cultures found in Cuba, is reminiscent of the notion of 'transculturation': the complex processes of cultural destruction, retention, reinterpretation and interpenetration described by Cuban scholars such as Fernando Ortiz (for a selected bibliography of Ortiz's work see Moore 1994: 53-54). Like these scholars, she suggests that the crucial vibrancy and life force embodied in the *sabor* aesthetic is the product of Cuba's unique cultural blend and the way in which these musical forms have intermingled and mutated. Similarly, a Cuban pianist and guitarist that I spoke to in London also made a connection between the concept of *sabor* and notions of transculturation:

> I think that the Cuban population naturally have that manana, sabor that you are talking about. Exactly because of the roots that we have, we are coming from a very deep heritage from Africa that is rhythm. Even people that have never even studied music they can take a box and they can [sings percussion part] do the percussion and never studied any instrument or anything. Therefore, that's why I think that Cuban people are very rhythmic in their work more than melodic. And then with the combination of all these rhythms that we have in the blood, coming from Africa, different kinds of rhythm and the combination of the other roots that we have, that is the Spanish influence. I think that that's the taste, you know, the sabor, the mix or the ingredients that naturally we have. Then the style of life, everybody is on the street, everybody's laughing, everybody is making fun for

> everything, being noisy all the time, the way that we talk, the way that we speak have rhythm, have noise, have music. And all these things they reflect in the music and then it's the way that the music sounds so alive (Alina Carmona, interview, 20/8/10).

For Imilka Fernandez de Posada and Alina Carmona, *sabor* is a product of Cuba's diverse cultural and musical heritage, as well as a shared lifestyle, shared experiences, a certain attitude to life, and a sense of informality, spontaneity and rhythmicality that is evident in everyday social interactions, as well as the musical ones. The comments of these musicians suggest that the energy, vitality and flavour of Cuban dance music lies in the way in which it dynamically balances a diverse array of cultural and musical influences to produce a unique rhythmic feel and aesthetic. However, caution is required when discussing connections between *sabor* and notions of transculturation. Moore argues that Ortiz (1881-1969) was considered a "progressive thinker by the standards of a majority of his contemporaries at the turn-of-the-century" (Moore 1994: 48) and his concept of transculturation was developed as a counterpoint to analogous concepts such as 'acculturation', 'syncretism' and 'synthesis', which, at the time, were criticised for being Euro-centric, narrow in scope and somewhat ambiguous (Kartomi 1981; see also Blacking 1977; Nettl 1983).

Nevertheless, Ortiz's publications are susceptible to similar criticisms: as Moore notes, "while progressive in many respects, it tends to distinguish between what are perceived as "pure" or "authentic" cultural forms and those which have been subject to modification, thus displaying biases typical of scholarship of the period" (Moore 1994: 44). In addition, Moore argues that the writings of Ortiz are poorly developed from a theoretical perspective, failing to "provide a dynamic model explaining the *reasons* for transculturational processes at any given time" (Moore 1995: 190), are methodologically unsound (Moore 1994: 45) and persistently racist and class-biased. Of the latter Moore

writes that "his attitudes towards lower-class Afrocuban expressive culture range from aggressively racist in early works to a complex ambivalence in the later years" (Moore 1994: 47).

Transculturation theory has however influenced the formal study of Cuban musical culture. Many contemporary Cuban music scholars draw on Ortiz's work (Carpentier 2001; Manuel 1991b; Perna 2005) and as Froelicher (2005: 14) points out in his study of *timba*, contemporary musicians even use the term transculturation to describe the unique blend of African and European cultural elements that characterises their music. Certainly the comments of Imilka Fernandez de Posada and Alina Carmona, above, suggest that the notion of transculturation holds some relevance for many Cuban musicians. What remains unclear is the precise nature of the relationship between the *sabor* aesthetic, identity, race and ethnicity and the complex historical and intra-social processes that have shaped the development of contemporary Cuban musical culture. These issues are as intriguing as they are complex and discussing them in full goes beyond the scope of the present study.

Sabor, Participation and a Sense of Community

Another socio-historical aspect of the *sabor* aesthetic is its strong connection to and identification with particular working-class communities. For example, the celebratory communal gatherings of early Cuban rural workers formed the essential characteristics of the popular vocal style *punto guajiro*, or *punto cubano* (Linares 1991; Roy 2002), while the religious music and dance forms of Yoruban slave plantation workers developed around the mutual aid and recreational societies of the *cabildos* (Furé 1991; Rodriguez 1991a; Roy 2002). Furthermore, early incarnations of secular music and dance forms such as *son* were born from the collective and spontaneous social gatherings of working-class rural communities in eastern Cuba (see chapter 1).

Several musicians suggested that in contemporary Cuba informal gatherings of working-class communities still act as an important catalyst for music that has *sabor*. For instance, Alina Carmona, who earlier spoke of Cuba's ethnically diverse musical heritage, said later during the same interview that:

> That's something that could be related to your question [about sabor] because in Cuba most of the people practise this kind of religion, santería...and most of the people can play and can sing as well this kind of music. It's a music that you can hear at the back of your house in your neighbourhood, very close to you and everybody knows...you know about la rumba, that's a kind of music that came exactly like that in a very informal context. That was a fiesta. You don't need any venue, any place, any specific instrument. In fact, there were boxes with bacalao [cod] that was exactly the kind of box they needed to make la rumba...you don't need any fine background, you just pick up melodies (Alina Carmona, interview, 20/8/10).

Alina Carmona's co-performer, Cuban *son* and salsa violinist Gabriel Foncesca, made a similar point, suggesting that the flavour of Cuban music was born from the expressions of informal community gatherings:

> I think the Caribbean, the weather, the hot weather and that keeps people outside and like a community, different communities they express their feelings...Buena Vista Social Club, all these guys...most of them they never went the music school and then they come from communities like Ibrahim Ferrer from Santiago de Cuba...they come from just different backgrounds in communities, outside, you know, playing the guitar and they became stars (Gabriel Fonseca, interview, 20/8/10).

My own experiences in Cuba resonated with interviewees' comments: the *sabor* aesthetic seems deeply intertwined with everyday community life in working-class communities, and musical participation in community events provides an important forum for negotiating tradition and innovation. In April 2010, I attended many community-based music events in Havana. These included, a performance at the Conjunto Folklórico de Cuba, which represented the full spectrum of Afro-Cuban folkloric traditions ranging from dances of the Yoruba deities through to dances of Haitian origin and *salsa*, private *rumba* parties, and a *santería* possession ritual in a temple home (see chapter 1 for more details of the latter). One striking feature of these events was the diversity of age ranges amongst both the performers and their audiences. Ages ranged from approximately 18 to 60, and, at times even younger and older, and the audience members included both young children and grandparents. After one *rumba* party, I asked a friend and *rumbero* about this age diversity. He told me that it was a very important aspect of the tradition as older people transmit their experiences and knowledge to the younger ones, which helps to maintain a sense of community and passes on the cultural traditions through generations. If this were not done, he said, their experiences and knowledge would be lost (Jesus Martinez, personal communication, 11/4/10).

A second striking feature of participatory community events in Cuba is the blurring of the division between performers and audience members. Although there is some variation depending on the type of event (in *santería*, initiation is required to play the sacred *batá* drums) and venue (larger, more commercial clubs such the Casa de la Música in Havana have large inaccessible stage areas) there is a sense that audiences are part of the performance and they are encouraged to participate by performing. In *rumba* performance, for instance, there is typically a core set of group members, but often (and sometimes during the same song) fellow musicians will take over the drum part. In some cases this might be fellow *rumberos*, Europeans like myself who are studying the music or other members of the community. Whilst I am not suggesting that absolutely anybody can wander onto the performance space, the level of audience involvement and sense of

inclusion in music making is strikingly evident. To quote my field notes at the time, I wrote after one *rumba* event where I was invited to play *congas* and *chekeré*, 'there is a feeling of, if you are good at *rumba*, and you are invited, get involved'.

My experience is that the attitude of sociability, inclusivity and participation, evident in many community performance situations, seems complexly intertwined with certain musical features that characterise the dynamical groove and aesthetics of Cuban dance music. Some of these most enduring musical features are common to many Cuban and Cuban-related music and dance forms. They include the use of the extended *montuno* section that invites participation through dance and encourages dialogic rhythm section interaction, and the use of archetypal rhythmic patterns such as the *clave* and other key rhythm section *tumbaos* that form the rhythmic-harmonic basis of Cuban dance grooves. The following chapters explore the precise nature of these musical features and how the dynamical properties embodied within them might engender a sense of participation and inclusivity.

To summarise the main points presented in this chapter, the *sabor* aesthetic can be approached from multiple perspectives. From an individualistic perspective, when a musician performs with *sabor* they are playing with rhythmic assertion, sense of purpose and injecting energy, excitement and emotion into the music. In doing so, they are projecting a single, clearly defined rhythm that forms one important part of a larger polyrhythmic framework and actively contributing to a holistic ensemble sound. Furthermore, by playing with a certain rhythmic presence and expressive rhythmic feel musicians are communicating a participatory attitude, one that invites participation from co-performers and audience members.

From a collectivist perspective, *sabor* describes the unified sound of the ensemble, a sound generated by, and representative of, the aesthetic expressions of participating

musicians. Key processes that underlie the formation of the ensemble sound are the dynamic rhythmic interactions and the improvisatory conversations between the individuals that comprise the ensemble. These conversations provide the collective groove with a crucial drive and communicative energy, and the polyrhythmic framework within which these conversations are realised acts as a regulator constraining the level of temporal deviation from the prescribed rhythmic patterns. Intersubjectively shared knowledge of the musical tradition and knowledge of how to interact effectively with co-performers also plays a central role in the production of the collective *sabor* aesthetic, by providing the common ground that facilitates successful collective action.

For some Cuban musicians, the aesthetic of *sabor* denotes Cuba's rich and diverse musical and cultural heritage and is closely tied to concepts of race and ethnic and class identity. They understand *sabor* to be rooted in the socio-musical practices and attitudes of working-class communities, and they understand the unique Cuban musical aesthetic as the successful blending of diverse cultural and musical traditions that co-exist in Cuba. The socio-musical practices and participatory attitudes they point to, combined with Cuban dance music's formidable aesthetic force and dynamical groove, help to generate a sense of participation, community and collectivity.

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Chapter 4

The Clave and Cultural Models

In the previous chapter, it was argued that the *sabor* aesthetic embodies certain rhythmic attitudes, musical practices and collectivist sensibilities that invite participation and thrive upon dynamic rhythmic interaction between performers within a polyrhythmic framework. Following on from this discussion, this chapter investigates one key rhythm that forms the structural basis of this polyrhythmic framework: the *clave*.

The purpose of the investigation in this chapter is to describe the principles, dynamics and aesthetic significance of the *clave* within Cuban and Cuban-related musical traditions and to explore its relationship to notions of groove and *sabor*. Given the complexity of the subject, this chapter is divided into four main sections concerning firstly, theoretical material on conceptual and cultural models; secondly, how the *clave* relates to these theoretical concerns; thirdly, technical detail on the *clave* and its relationship to the underlying rhythmic pulse; and lastly, the dynamical properties embedded within the *clave*'s structure.

Conceptual and Cultural Models

When discussing the notion of cognitive 'models' it is useful to distinguish the two types that typically appear in literature concerned with musical cognition: 'conceptual models' and 'cultural models'. Conceptual models can be thought of as the cognitive constructs that individuals create and invoke to organise and make sense of their everyday perceptions, thoughts and experiences (Kessing 1987: 377; Shore 1996: 10; Strauss and Quinn 1997: 54). Music theorist Zbikowski goes further, arguing that conceptual models, as conceived of by cognitively-orientated cultural theorists such as Strauss and Quinn (1997), are "crucial to the way we construct our reality" (Zbikowski 2002: 111).

Furthermore, Zbikowski argues that conceptual models are not direct reproductions of experiences, but rather that they are dynamic, personalised, abstract representations of the real world events:

> Conceptual models are a response to, not a simple reflection of, the outside world. They deal with only a small proportion of that world and represent its structure in ways that have more to do with cognitive efficiency than with accuracy...every time we remember something, we strengthen some synaptic connections and weaken others, "re-wiring" our brain on a micro-level and subtly transforming the memory we would seek to recall. Such changes will have an influence, slight but cumulative, on our conceptual models (Zbikowski 2002: 111-112).

Whilst conceptual models are more personalised cognitive constructs, a cultural model, by contrast, is a construct that draws on a pool of shared cultural knowledge and understanding. These shared understandings form the basis, Strauss and Quinn (1997) argue, by which people interact with their environment and without them "it would be impossible to get anything done, plan for the future, or even interpret what is happening...social interaction would be impossible as well" (Strauss and Quinn 1997: 49). Roy D'Andrade offers this definition of a cultural model: "A cultural model is a cognitive schema that is intersubjectively shared by a social group" (D'Andrade 1987: 112). Further, that a cultural model is intersubjectively shared when everybody in the social group knows and understands the schema: "it is a statement of the common-sense understandings that people use in ordinary life" (D'Andrade 1987: 113).

Some cognitive anthropologists argue that D'Andrade's approach and theorisations, whilst concise and intriguing, present a number of problems. Firstly, there is a lack of terminological consistency when describing models, with a diverse array of terms used interchangeably by many scholars, with little clear distinction between them. For example,

'cultural schemas' (Strauss and Quinn 1997: 140), 'instituted models' (Shore 1996: 45), 'image schemas' (Lakoff 1987: 118), 'global conceptual model' (Zbikowski 2002: 47), and 'folk models' (D'Andrade 1987: 113; Johnson 1987: 7). Shore (1996) attempts to remedy this problem by presenting a detailed taxonomy of models (linguistic, non-linguistic, kinaesthetic, visual, social, spatial, diagnostic, emotional etc.) that people use to make sense of their worldly experiences. Yet drawing a clear dividing line between these concepts seems unclear, as they are highly interrelated. More broadly, the distinction between conceptual and cultural models is also unclear: how shared must cultural knowledge be in order to qualify as a cultural model rather than a more personalised conceptual model?

The distinction between, and the precise nature of, conceptual and cultural models is at best fuzzy and appears to depend in no small part on the differing perspectives that prevail in different academic disciplines (Kessing 1987, Shore 1996). Shore writes that:

> The mainstream of research in cognitive psychology has studied personal mental models, while anthropologists have tended to assume that most mental models were cultural models. The assumptions of each discipline are quite different. Cognitive psychologists treat mental models largely as subjective representations constructed by individuals in a relatively direct relationship with a physical environment. By contrast, cultural anthropologists assume that cultural models are intersubjective representations, constructed by individuals in relation to a social environment (Shore 1996: 49).

Cross-disciplinary debates aside, there is some general agreement in the literature that the term cultural model refers to cognitive representations of knowledge, thoughts, ideas and feelings constructed by individuals in relation to their socio-cultural environment and that these representations are widely shared by members of a community. These models

are informed by shared understandings and are built from shared experiences (Strauss and Quinn 1997; Quinn and Holland 1987; Shore 1996). Conceptual models are more subjective, personalised representations of knowledge, thoughts and experiences. In order to elaborate further on the precise nature of conceptual and cultural models and to consider how these notions might related to groove in Cuban dance music, the next section outlines literature that has applied these ideas to music performance.

Conceptual and Cultural Models in Music Performance

Lawrence Zbikowski draws on cognitive psychology, cognitive linguistics and artificial intelligence to develop a theory of how musicians conceptualise, organise and make sense of their musical experiences. These conceptualisations, once learned or created, form a knowledge base that is used to inform a musician's future performance. At the core of Zbikowski's theory is the idea of a conceptual model. Conceptual models consist of basic concepts regarding the performance of a particular piece of music such as the series of pitch intervals that make up the melody, rhythmic patterns, and the metre and tempo. The conceptual model links these basic concepts together to form a coherent whole or knowledge base relating to the entire musical piece. In addition, musicians must also hold a conceptual model of how to find the particular notes for the melody on their instrument, how to produce these notes in the correct order, how to shape the pitches and rhythmic phrases into a convincing version of melody, how to coordinate their playing with other members of the ensemble and so on. Musicians, then, must create and employ several conceptual models – and know how to coordinate these different models – in relation to the performance of a particular piece (Zbikowski 2002: 218).

Using, as examples, the jazz standards, "Bye Bye Blackbird" and "I Got Rhythm", Zbikowski postulates that a participant within the jazz community will frame their conceptual models of how to play a particular jazz tune within the global conceptual model (cultural model) of a 'jazz standard'. The global model details shared cultural knowledge

such as historical information regarding 'classic' performances of a particular tune by different artists, it informs decisions regarding what constitutes a typical or an atypical rendition of a particular tune, it guides performance practices, and forms the basis by which members of a musical culture engage in complex patterns of musical communications and interactions (Zbikowski 2002: 201-242).

Ethnomusicologists concerned with the investigation of cognitive representations of musical knowledge have developed similar notions to that of Zbikowski. Simha Arom and John Blacking, for example, have theorised that African musicians employ cultural and conceptual models that act as a framework for improvisation and interaction during musical performance. Arom discusses how African master drummers use archetypal models of rhythmic patterns as a reference during performance to determine if innovative rhythmic patterns are acceptable variations of established rhythmic patterns (Arom 1991: 148) and Blacking argues that musical communities share patterns of thought and interaction that mediate notions of musical consistency, variation, creativity and change (Blacking 1977a).

John Baily (1988), in his study of the music traditions of Afghanistan and North India, makes a distinction between representational and operational models. Specifically, Baily argues that within these traditions musicians develop static representational models, which describe what a musician already knows but have little direct role in performance (e.g. stereotypical rhythmic patterns) and operational models that play a more dynamic role in performance and are developed through exposure to performances with other musicians (see also Baily 1985). Making a similar argument and drawing on Baily's theorisations, Benjamin Brinner (1995) postulates that within the Javanese gamelan tradition competent musicians must develop both more static representational models, learnt through explicit formal instruction on various aspects of their musical tradition, and

dynamic operational knowledge that is acquired through interactions with co-performers (Brinner 1995: 115-116).

As my primary interest lies in exploring the role shared knowledge plays in interactive and collective groove production and Cuban musical aesthetics, the approach adopted throughout the present study is to investigate those aspects of the Cuban musical tradition that could truly be considered shared cultural models. One prominent example of a shared cultural model within the Cuban musical tradition is the *clave*. As will become evident throughout the following discussion, musicians may interpret the *clave* in slightly different ways depending on the genre performed, but it is essential that every performer knows, understands and can effectively utilise the *clave* when generating a collective groove with the 'correct' Cuban aesthetic. When exploring different facets of the *clave*, I draw on the work of Zbikowski and ethnomusicologists such as Baily and Brinner in an attempt to clarify the nature of the relationship between conceptual and cultural models in the performance of Cuban dance music, as well as attempting to investigate how the *clave* relates to collective groove production and Cuban aesthetics.

The Clave as a Cultural Model

The term *clave* is of Spanish origin, literally meaning key, clef, code or keystone[10]. Such dry dictionary definitions, however, fail to capture the immense significance the *clave* has in a Cuban musical context, where its meaning is threefold. The *clave* simultaneously refers to a constantly repeated rhythmic pattern (figures 4.1 and 4.2), the musical instrument (cylindrical hardwood sticks) on which the rhythm is most typically played, and, perhaps most importantly, the *clave* is a rhythmic concept that serves as a structural and

[10] The notion of the *clave* as a rhythmic keystone has been taken further by some authors that publish educational literature on Cuban music (e.g. Cornelius and Amira 1992: 15; Peñalosa 2009: 85). For them, the function of the *clave* within the rhythmic framework of Cuban musical ensembles is analogous to the wedge-shaped block placed at the top of an arch that locks all the other stones in place.

aesthetic foundation that guides composition, arrangement, performance and improvisation (Orovio 2004: 54).

When studying Cuban dance music, formally or informally, the *clave* is most likely to be the first aspect of the music taught. All Cuban musicians, regardless of their chosen instrument and preferred performance genre, can articulate the *clave* and Cuban musicians always point to the importance of the *clave* within their tradition. Moreover, during fieldwork in Cuba I noted that it is common practice for audiences to participate in the performance by clapping the *clave* and whilst walking through the street of Havana, I noted children tapping the *clave* with makeshift bats during baseball games. Although the *clave* does not perhaps enjoy such a presence in everyday life in European countries, my own experiences performing Cuban music in the UK suggest that in music-making situations the *clave* remains crucial, being frequently referred to during rehearsals and forming the foundation of the groove in the performance of Cuban-related styles such as salsa (whether explicitly articulated or not).

Given the widespread importance of *clave,* I was keen to explore further its relationship to groove and aesthetics. During one interview, a Cuban *sonero*, percussionist and guitarist that I spoke to in London said that, "it's the boss for us, it's fundamental" (Jesus Bello, interview, 11/8/09). Similarly, a London-based Cuban pianist and guitarist described *clave* as an "inner rhythm", adding that "you need to have the clave inside...otherwise you are lost" (Alina Carmona, interview, 20/8/10). A Cuban percussionist, *rumbero* and *son* performer also highlighted the significance of internalising the *clave* and added that the rhythmic pattern performs a timekeeping or metronomic function: "the clave is a click that is inside. In the percussionists' case...if you don't have it inside you, you can't be a percussionist" (Vicente Areucibia, interview[4.1], 23/7/10).

These comments highlight the widespread significance of *clave* as an internal rhythmic guide for musicians. However, dancers also cite the importance of the *clave* as a rhythmic guide. A *rumbero,* dancer, singer and percussionist I spoke to in Havana said that:

> I am a dancer and I have the clave inside me. The instrument that, for me, every musician and artist in general, has as a guide, is the clave. Without clave, there is nothing (Jesus Martinez, interview[4.2], 6/4/10).

Jesus Martinez's fellow *rumbero,* dancer and singer, Arianna Martinez, also spoke of how the constant and unwavering repetition of the *clave* has a stabilising effect for Cuban dancers and musicians during *rumba* improvisations and also pointed towards the important aesthetic influence of the rhythm:

> It is very important to maintain a stable timing during the improvisation [the montuno section], during the number, in the body, during the time it lasts. Because otherwise you get music that is dizzy...it's uncomfortable for the dancer...and it's uncomfortable for the one who sings it, even for the musician...if the clave is not fixed at a certain tempo...it feels dizzy. That's the way we say it here, it becomes dizzy. And one feels odd (Arianna Martinez, interview[4.3], 6/4/10).

Whereas the comments of these musicians and dancers suggest that *clave* is a more internalised and embodied conceptual model that guides and stabilises their own rhythmic activities, other musicians placed more of an emphasis on its shared intersubjective nature, and spoke of the central role *clave* plays in uniting the musical ensemble and facilitating effective musical interaction. Cuban percussionists were particularly vocal on this topic. For example, one Cuban percussionist and teacher, now resident in Spain, said that:

> There's something that unites us...it's an internal matter of Cuban music, and those are the rhythmic claves. All the musicians need to know those rhythmic claves, they have to know it, how they work (Marcos Gregorio, interview[4.4], 24/2/10).

Marcos Gregorio's assertion that the *clave* is "something that unites us" suggests that it is a shared cultural model that binds musicians together during performance. The following anecdote from Cuban percussionist Vicente Areucibia, who commented earlier on the metronomic function of the *clave*, demonstrates how the *clave* might bind musicians together during interactive groove production:

> We know many percussionists who are virtuosos, on their own, but when you manage to accompany them, you lost them, because there is no clave. I had a singing teacher, musical theory teacher, who was a very good teacher. His classes were extraordinary. However, when he played his instrument, it was impossible. And he used to say, 'no, no, I don't do the clave' (Vicente Areucibia, interview[4.5], 23/7/10).

Vicente Areucibia's comments are particularly interesting. He states that although some of his fellow percussionists are "virtuosos" and that his music teacher possessed "extraordinary" knowledge about the musical tradition – which presumably included theoretical knowledge of *clave* rhythms – they were challenging to interact with because they played without reference to the *clave*. These comments echo the discussion in the previous chapter, where it was argued that for Cuban musicians to function effectively within the ensemble and collectively produce music with *sabor*, they must develop individual skills and knowledge of the archetypal rhythms but also hold knowledge of how to interact intuitively with fellow performers.

To explore this idea further, it is useful to revisit Baily's and Brinner's distinctions between 'representational' and 'operational' models that were introduced at the beginning of this chapter. Vicente Areucibia's comments suggest that simply developing more formal, static models of the *clave* are insufficient. For musicians to become competent and effective performers within the Cuban musical tradition they must also develop dynamic operational models of how the *clave* functions as an interactive framework within the ensemble, knowledge that can only be acquired through meaningful interaction with others. In short, knowing the *clave* as an abstract rhythmic pattern is not enough; performers must also know how to use the *clave* to communicate with their co-performers during real-time interactions.

The development of this level of rhythmic competence with regard to the *clave*, or "clave sense" as Washburne (1998: 162) puts it in his study of *clave* in salsa, is similar, Washburne argues, to Waterman's (1952) "metronome sense" in African musical performance. In his influential article, *African Influence on the Music of Americas*, Waterman coined the term "metronome sense" to describe an implicit culturally shared sense of pulse that serves as an ordering principle, connecting participants together in musical events[11]. The arguments made by Washburne and Waterman, were underscored by a Cuban violinist I spoke to in London. He spoke of his experiences performing *son* music in Cuba, and *salsa* in the UK and the US:

> You have to have the clave here connecting everybody...it has to be 'in clave' otherwise [makes cut throat gesture] and immediately, 'oh, where are you from

[11] See also Chernoff (1979) and Waterman (1990a, 1990b) for further discussion of "metronome sense" in African rhythmic sensibilities.

> man' or if you are Cuban they call you Gallego[12], from Spain...they say ok, Gallego, Gallego! And so many songs have clave but they go for a while without clave and then come back. It happened a lot with salsa in the 80s but now they realise it's very important, *la clave*. And I've been there with those guys and Cuban music is like a pattern and they follow all these Cuban musics, the roots of the son Cubano (Gabriel Fonseca, interview, 20/8/10).

For Gabriel Fonseca, being "in *clave*" does more than simply connect participants through shared knowledge of the musical tradition and common rhythmic sensibilities, knowing how to play with a *clave* sense – like notions of playing with *sabor* (see chapter 3) – is also a powerful marker of musical competence, authenticity and Cuban identity or Cuban-ness. The *clave* then, is much more than a metronome, a timekeeper or a musical keystone that provides structural foundation to the music. The *clave* is also an important intersubjectively shared cultural model that guides the aesthetic judgements and interactive behaviours of performers of Cuban dance music, and Cuban-related styles such as *salsa*.

More broadly, these findings shed more light on the relationship between notions of conceptual and cultural models in music performance. They suggest that competent performers must develop models of archetypal musical features such as the *clave* that contain both more personalised representational knowledge as well as intersubjectively shared dynamic knowledge that affords, and is developed through interactions with co-performers. In order to explore further the idea of cultural models in Cuban musical

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[12] In Cuba, the term *gallego* literally means a Spaniard from the small province of Galicia in Northern Spain but is commonly used by musicians to describe a performance that is considered musically bland (Sublette 2004: 20). The term may have originated from stereotypical representations of the island's inhabitants used in *teatro vernáculo*, a form of mainstream theatre, popular in the late eighteenth and early twentieth century (Moore 1995: 173).

contexts, the following discussion details the most widely used *clave* patterns and explores, in more technical terms, what it means to play 'in' and 'out' of *clave*.

Clave as a Rhythm Pattern

Although different Cuban musical genres have developed their own specific *clave* patterns, the two most commonly used in Cuban popular dance and folkloric styles, such as *son* and *rumba*, as well as in Cuban related styles such as *salsa*, are the *son clave* and *rumba clave* (Acosta et al 2005; Doerschuk 1992: 315; Peñalosa 2009: 85; Spiro 2006: 12).

Figure 4.1 – Son Clave

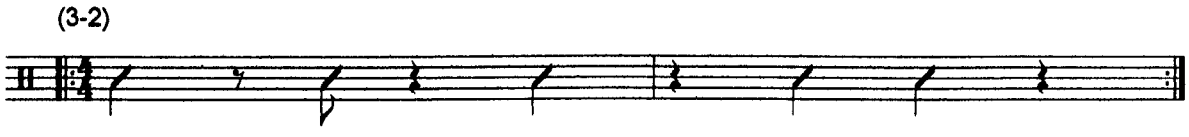
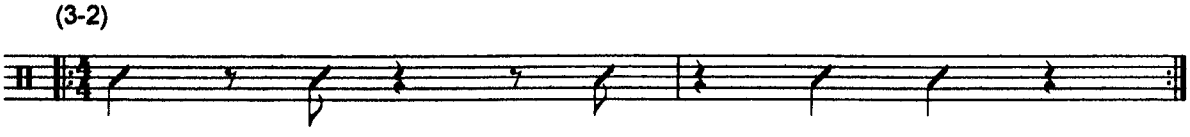


Figure 4.2 – Rumba Clave



(Examples adapted from Mauleón 1993: 48)

As the names *son* and *rumba clave* suggest, these patterns are typically associated with their respective musical styles. However, Cuban musical styles are more accurately viewed in terms of large musical complexes, each consisting of numerous highly interrelated genres. Further, this interrelational characteristic cuts across these complexes, with popular styles such as *son* and *rumba* enjoying symbiotic development. The result of this cross fertilisation is that *clave* patterns are utilised within many genres: *rumba clave* is principally associated with *rumba guaguancó* but is also used in *conga de comparsa*, *mozambique* and *timba*, and *son clave* features in *son-montuno*, *guaracha* and *mambo*, amongst many others (Mauleón 1993: 177-222). Further, in more eclectic styles

such as contemporary *son* and *salsa* the choice of *clave* may change during the course of a single piece of music (Spiro 2006: 12). In some musical complexes, the *clave* pattern can also be played on different instruments. Danzón[13] is a case in point, where its key rhythmic pattern (called the *baqueteo*) is typically played on the *timbales* and the *guiro,* rather than the *clave*.

Figure 4.3 – Danzón Baqueteo

(Example adapted from Mauleón 1993: 202)

As even a cursory glance at the three *clave* patterns shown in figures 4.1 to 4.3 will reveal, they are, like the genres in which they are used, highly interrelated. The difference between *son* and *rumba clave* (figures 4.1 and 4.2) is the displacement of the last stroke in the first bar by half a beat, and the difference between *rumba clave* and the *danzón baqueteo* (figures 4.2 and 4.3) is the addition of strokes 2 and 4 in the first bar and strokes 1 and 4 in the second. All *clave* patterns, however – regardless of their associated complexes and stylistic pattern variations, the instrument on which they are played or the terminology used to describe them – have the same important function: they serve as a guide to which all other rhythmic elements relate.

[13] Danzón (literally meaning 'big dance') is a type of predominantly instrumental, light-classical, rondo-form concert and salon music/dance form popular from the late nineteenth through to early twentieth centuries. Danzón was deemed Cuba's national dance until around the 1920s and in contemporary Cuba *danzónes* are still composed, performed and enjoyed but perhaps with less frequency than other popular music and dance styles (Duran 2007; Rodríguez 1998: 134). Some authors claim that music of the *danzón* complex spawned two important and internationally recognised Cuban music/dance styles: the *mambo* and *cha-cha-chá* (Carpentier 2001; Furé 1991; Leymarie 2002; Orovio 2004; Rodriguez 1998; Roy 2002; Sublette 2004; Urfé 1984).

Clave as a Binary Rhythmic Pattern

Another unifying feature of the most common *clave* patterns is that they can be conceived as having a binary structure, consisting of three strokes in the first bar, called the 'three-side', and two strokes in second bar, called the 'two-side'. Depending on the genre, *clave* patterns can be interpreted in the reverse direction, with songs starting on the two-side rather than the three-side. In order to communicate this when writing and arranging, sheet music of Cuban and Cuban-based musics such as *salsa* and Latin jazz are often labelled with the direction of the clave: 2-3 or 3-2[14]. For example:

Figure 4.4 – 2-3 Son Clave

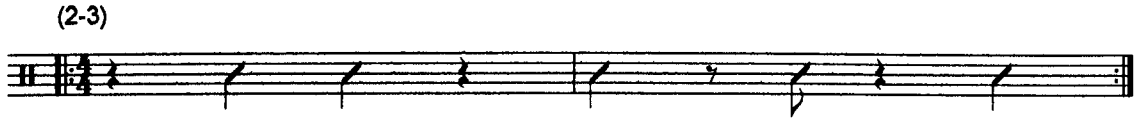
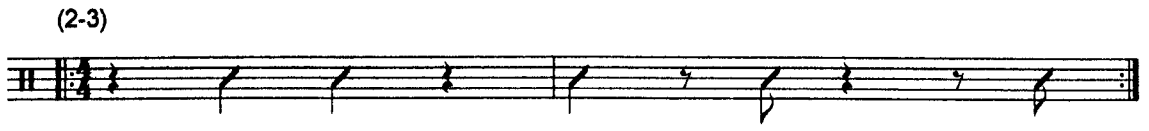


Figure 4.5 – 2-3 Rumba Clave



The direction of the *clave* (3-2 or 2-3) is largely determined by the melody, or more accurately, by the rhythmic phrasing of the melody and how well it sits with the *clave* pattern. Poorly phrased melodic material by the singer, the horns, bass, piano or any other instrument, is referred to as *cruzao*, or *cruzado* (crossed): a Cuban term meaning a musician is playing a 3-2 phrasing against a 2-3 *clave*, or vice versa. To Cuban musical sensibilities, playing 'out of *clave*', melodically or rhythmically, would sound messy, confused and inappropriate, and would simply not have the correct groove or aesthetic. I

[14] This is a practice, Peñalosa (2009: 143) argues, that was developed in the 1940s by Mario Bauzá, band leader of the New York-based group Machito and his Afro-Cubans, and today is a standard concept in *salsa* and Latin jazz. Amongst Cuban musicians, there is some debate as to the validity of the 2-3/3-2 concept. Some folkloric musicians claim that 2-3 is foreign to Cuban traditions and is a North American and European structural imposition and that all *clave* music, regardless of where phrases may start in the *clave* sequence, is 3-2. See Peñalosa (2009: 158, 249) and Berríos-Miranda (2002: 37-40) for a fuller discussion.

have heard Cuban musicians describe playing *cruzado* as 'riding the horse backwards' or, more strongly as a 'violation' of the *clave*. A good example of crossed *clave* is the 1989 *salsa* tune Cali Pachanguero, by Colombian band Grupo Niche. Although the audience may not notice it, for *clave*-savvy musicians, the tune is extremely challenging to follow "because the *clave* is all messed up" (Manuel 1995: 40; see also Washburne 1998: 167). On several occasions, I have learnt Cali Pachanguero for performances in London – and whilst it is a popular salsa tune, trying to interact intuitively with other rhythm section members to generate a consistent driving groove is not easy due to the multiple crossed *clave* and direction changes between sections. On the subject of the relationship between groove, aesthetics and the playing *cruzado*, a Cuban cellist I interviewed in Spain had this to say:

> I sometimes watch some bands playing with the wrong clave, inverted and that doesn't work, it's uncomfortable to dance to for a Cuban or a Latin person. There's something which is not working when the clave is wrong, but well, there are many people who don't notice that, but other people notice it, and we see it can be difficult, but I prefer the rhythm to be more cadential (Luis Varona, interview[4.6], 22/2/10).

Luis Varona's comment that playing the *clave* "inverted", is "uncomfortable to dance to for a Cuban or a Latin person" highlights two important points. Firstly, it speaks to the importance of the relationship between archetypal rhythm patterns like the *clave,* the groove of the music and dance. Secondly, it reinforces the argument made earlier that *clave* is a powerful cultural model that connects participants within the Cuban musical tradition through an intersubjectively shared sense of rhythmicality and aesthetic attitudes and acts as marker of musical competence, authenticity and identity.

The distinction between what is acceptable "*clave* license" (Mauleón 1999: 16; see also Peñalosa 2009) and what might be considered not in keeping with tradition is blurred with the practice of playing *contraclave* (counter-clave). Similar in nature to playing *cruzado*, *contraclave* is employed by instruments that occupy a more improvisatory role such as the *quinto* in *rumba* and the *tres* in *son*. By playing a 2-3 rhythmic phrase against a 3-2 *clave*, a skilled soloist can temporarily create a contrapuntal rhythmic disruption that contradicts the *clave* before playing an answering phrase that reinforces it. What constitutes an exciting and legitimate use of playing *contraclave* for aesthetic effect and not simply playing *cruzado* is dependent upon the instrument being played, individual artistic choices and the conventions of particular musical genres (Peñalosa 2009: 171-211). Playing *contraclave* in more traditional styles such as *son*, *guaracha* and *cha-cha-chá*, for example, is unlikely, but in contemporary *timba* compositions the technique may be deliberately used to enrich the arrangement (Peñalosa 2009: 230-231).

There is also a possibility, as one *son* Cuban pianist I spoke to in Spain commented, of varying attitudes to 'clave strictness' in different regions within Cuba. He spoke of his interactions with musicians from the west of the island:

> The people from the Oriente [Eastern Cuba], from Santiago de Cuba, play son in a different way to the way they play it in Havana [in the West]. In Havana it was always more fused. The people from the Oriente are normally very strict with their clave. However in Havana no, in Havana they change the clave. When we feel that this changes [pointing to the heart], the clave changes (Jorge Poutal, interview[4.7], 22/2/10).

Although there may be, as Jorge Poutal's comments suggest, differing interpretations of how strictly the *clave* should be adhered to within Cuba, and, in the case of styles like

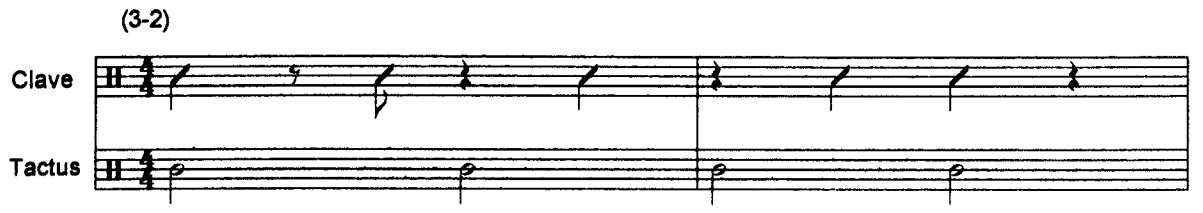
salsa, different international interpretations of what constitutes acceptable *clave* licence, it undoubtedly is of some importance to the groove of Cuban dance music and notions of *sabor*. The next section considers another important aspect of this groove and aesthetic, the *clave's* relationship to the underlying pulse.

Clave, Tactus and Notation

Notions of tactus, or pulse, date from as early as the 15th century, when music theorists correlated the idea of tactus with resting pulse, breathing rate, walking period and the keeping of time by beating with the hand (Arom 1991: 189; London 2004: 31). Subsequent music theorists have reinterpreted the use of term tactus. For example, Lerdahl and Jackendoff (1983: 71) termed the tactus the "primary rhythmic level", arguing, "...this is the level of beats that is conducted and with which one most naturally coordinates foot-tapping and dance steps". Similarly, Krebs (1999: 30) describes tactus as a "primary metrical layer" theorising that "its pulses become reference points for all rhythmic activity in the given work" (quoted in London 2004: 32). Given the theoretical significance of tactus, particularly the important relationship it appears to have to rhythm and metre, and movement and dance, I was keen to determine its relationship to the *clave* in Cuban dance music, and to discover what this relationship might reveal about how the *clave* functions as a cultural model of rhythmic organisation.

Overwhelmingly, educational and instructional literature that details Cuban musical genres such as *son* and *rumba,* and Cuban-based dance music like *salsa*, states that to achieve the 'correct' feel when playing rhythmic patterns such as the *clave* you are required to mark the underlying pulse by tapping half-notes (minims) with the foot (Del Puerto and Vergara 1994: 22; Mauleón 1993: 48; 1999: 7; Peñalosa 2009: 11; Spiro 2006: 45). Notated against a 3-2 *son clave* in 4/4, the pulse would be:

Figure 4.6 – 3-2 Son Clave and Tactus



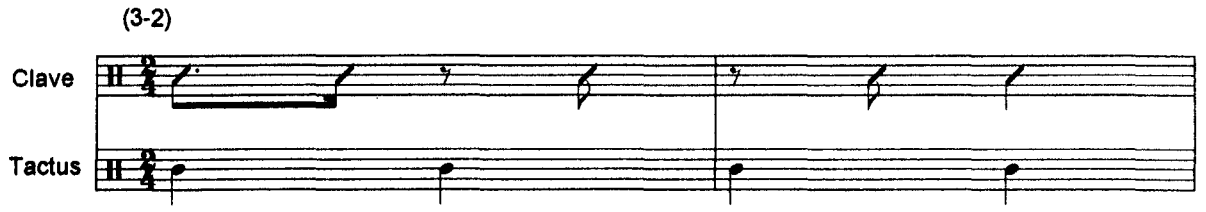
(Adapted from Mauleón 1999: 7)

In an attempt to understand fully why performers of Cuban dance music might prefer, as Mauleón and others argue, to mark a half-note tactus against the *clave*, I asked musicians where they would most intuitively tap their foot to the *clave*. A Cuban guitarist, *tres* player and *son* musician I spoke to in the UK said that:

> It is impossible to be able to tap your foot in 4/4, at least for me, you know what I mean, after half an hour my feet would be hurting like anything. I always mark it in two [half-notes], but when it comes to writing and understanding a certain phrase or passage, I read it as if it was in 4/4, and if they write the music in 4/4, happiness! I am very happy. If they write it in 2, then I have to think a bit (Alejandro Albar, interview[4.8], 23/7/10).

Alejandro Albar shows a clear preference for a half-note tatcus when performing *son*. Furthermore, with the comment, "if they write it in 2, then I have to think a bit", he is making reference to fact that when the *clave* and other musical materials are notated in 2/4 it requires the use of sixteenth notes, which can be more challenging to read. Notated in this manner, a 3-2 *son clave* would read:

Figure 4.7 – Son Clave in 2/4



(Adapted from Peñalosa 2009: 139)

2/4 was traditionally used by early *son* and *danzón* composers from the 1880s onwards, but was superseded in the 1900s by 4/4 (Del Puerto and Vergara 1994). Perhaps, this was due to the influence of jazz and other popular style that predominantly used 4/4 (Mauleón 1993: 52) or, as Alejandro Albar suggests, it was simply easier to read. Cohen and Madera (1974: 13) makes a similar point with regard to the notation of *rumba guaguancó*, arguing that: "to make the learning process easier, the musical notation for the Guaguanco was written in 4/4, but its correct execution calls for a 6/8 'feel'". Contemporary notation uses a variety of different metres and conventions in attempt to capture and communicate the correct rhythmic feel and pulse in a range of Cuban dance music. For example, 2/4 is sometimes used in the notation of *timba* (Perna 2005: 120), 4/4 is typically used for *son* and *salsa*, 2/2, 12/8 or 6/8 are sometimes used to notate more African-orientated Cuban styles such as *santería batá* performance and *rumba guaguancó* (Del Puerto and Vergara 1994), as well as other rhythmic notation conventions such as Time Unit Box System or TUBS (Peñalosa 2009: 139). Throughout the following text, musical examples will be presented in 4/4 for reasons of clarity and consistency.

Regardless of the notational convention used to capture and communicate musical ideas and aesthetics, when asked about their preference, performers of Cuban dance music indicate a clear preference for the half-note pulse against the *clave*. A classically trained Cuban cellist that I spoke to in Spain, said that this preference had important aesthetic connotations:

> I think it is there [half-note pulse]. The other one [quarter-note pulse], I think it's too busy...the two [half-note pulse] has more sabor as we Cubans call it. When you are in four [quarter-note pulse] you are less free. If you think in two [sings clave with half-note pulse] it has more sabor...to say richer. It tastes better (Luis Varona, interview[4.9], 22/2/10).

For Luis Varona, the half-note pulse against the *clave* feels more "free", is "richer" and is more aesthetically pleasing to Cuban musical sensibilities: it "has more sabor". Similarly, a Havana born Cuban percussionist I also spoke to in Spain said that: "Por 2, si, por 2 siempre. Así, suena muy autentico"/In 2, yes, always in 2. Like that, it sounds very authentic (Marcos Gregorio, interview, 24/2/10). The assertions of these Cuban musicians suggest that the half-note tatcus, like the *clave* pattern to which it relates, is a cultural model that acts as marker of musical authenticity and identity, and is important for the music to have *sabor*. This argument is underscored by the following quote from a Cuban violinist from Havana who is now resident in London. He spoke of the different rhythmic sensibilities he experienced when playing Cuban dance music with Cubans and Europeans:

> You are marking it in two [taps foot in half-note pulse]. Everybody in Cuba will do this. Nobody will do this [taps foot in quarter-note pulse]. I see all these jazz musicians like this [taps foot in quarter-note pulse]. And when I see some guys from Europe they go to play some Cuban music I see them like this [taps furiously in quarte r-note pulses] all the time, you know. That's stressful for me, easy! (Gabriel Fonseca, interview, 20/8/10).

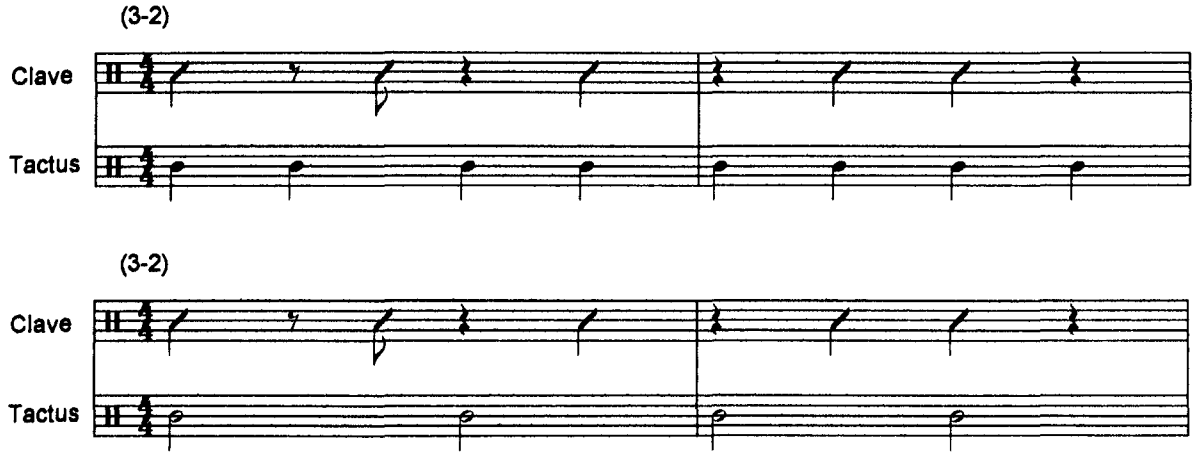
Here, Gabriel Fonseca is making a clear connection between the 'half note pulse *clave*' performance model and notions of Cuban cultural identity: "everybody in Cuba will do this". However, my experience playing Cuban music with musicians of multi-ethnic

background in the UK suggest that this model is perhaps more of a marker of competence or the level of enculturation within Cuban musical traditions, rather an a distinction based solely on ethnicity or cultural background. Evidence to support this argument comes from interviews with English musicians who, like me, have studied Cuban dance music in the UK, Latin America and in Cuba. For instance, a London-based English jazz and salsa pianist, who had studied piano in various parts of Latin America, described the quarter-note tatcus as "pretty stultifying" and the half-note pulse as "swinging like a pendulum" (Hamish Balfour, interview, 9/4/09). Similarly, percussionist Andy Martin, who studied in Havana said that:

> So that's your pulse [plays half notes on the cowbell]...as soon as you start thinking 4 in a bar on that, the whole momentum and even my arm, you know, is thrown...forget it, I mean, we've lost the feel...whereas thinking of it in two [half notes] just gives you that, even at a slow tempo, fast tempo...it just feels as if you've got so much more room to play with, within each beat, rather than thinking 4 flying by...it feels more relaxed for me thinking in two (Andy Martin, interview, 30/3/09).

Andy Martin's comments suggest, like those of Cuban musicians, that the 'half note pulse *clave*' model feels more "relaxed", has "more room", 'feels' more authentic, and helps generate a groove that is more aesthetically pleasing, or to quote Hamish Balfour: it swings "like a pendulum". The above evidence strongly suggests that although a variety of notational conventions may be used, for *son* and salsa musicians, the 'half note pulse *clave*' model is preferred within the Cuban musical tradition in order to generate a groove with *sabor*. The reason why the 'half note pulse *clave'* model produces a groove that is perceived as having *sabor* and as having a sense of "swing" may be largely due to the level of syncopation that it affords.

Figure 4.8a-b – Son Clave in 4/4 Marked with a Quarter Note and Half Note Pulse

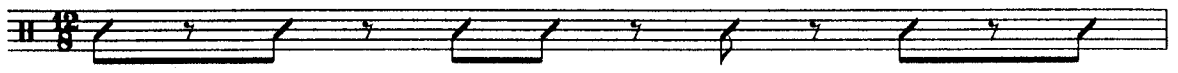


As illustrated in figure 4.8a, if the pulse is marked by quarter notes, strokes 1, 3, 4 and 5 are on beats, with only stroke 2 falling on an offbeat. If, by contrast, half notes are used to mark the pulse (figure 4.8b) only strokes 1 and 5 are on beats, the remaining strokes are off beats. The ramifications of this increased level of syncopation and the significance these ramifications might have in relation to the groove of *clave*-based music will be considered next.

Tension and Release in the Clave

As well as providing a structural foundation that guides compositions, arrangements and performance aesthetics, the 'half note pulse *clave'* model also embodies an important tension-release dynamic. To understand this dynamic is it useful to explore the relationship between the *clave* and what has come to be known as the "standard bell pattern" by many African music scholars (Agawu 2006; Arom 1991; Chernoff 1979; Nketia 1975; Jones 1959; King 1960; Locke 1982, and others).

Figure 4.9 – Standard Bell Pattern



(Adapted from Agawu 2006: 2)

Throughout West and Central Africa, the rhythmic pattern shown in figure 4.9 – also called the bell pattern, bell rhythm, timekeeper, time-line and phrasing referent – is pervasive and performs the same function as the Cuban *clave*. As African scholar Kofi Agawu surmises: "There is, in short, general consensus that time lines are materially real, widely used, and crucial markers of temporal reference in African ensemble music" (Agawu 2006: 3). In the same article, Agawu details the many variants of the standard bell pattern found in the numerous West and Central African musical traditions such as those of Ewe and Yoruba people and suggests how all these variants can be generated from the archetypal standard bell pattern. More intriguingly, from the perspective of the current study, Agawu makes a connection between the standard bell pattern and *clave*:

> The prospect of a deep parallel between the standard pattern in 12/8, which is generally – though by no means exclusively – associated with older, precolonial African music, and the clavé pattern in 4/4, which is associated with modern, postcolonial or neotraditional genres, not to mention numerous African-diasporic manifestations, is attractive. According to this explanation, the two patterns are mere transformations of each other, the latter representing a "binarization" of the former (Agawu 2006: 38).

Given the huge influence of West and Central African music on Cuban dance music, especially in the rhythmic realm, Agawu's implication holds considerable weight. Other scholars have made a more explicit connection between the standard pattern and *son* and *rumba claves*. For instance, North American percussionist and educationalist David

Peñalosa writes: "given its prototypical structure and its extensive use throughout Africa and the African diaspora, the standard bell pattern must be included in any survey of *clave*. In fact, some musicians call this pattern *clave*" (Peñalosa 2009: 60). Here, Peñalosa is referring to the fact that the *clave* pattern used in *rumba columbia*, for example, is identical in content, structure and usage to the standard bell pattern (see also Daniel 1995: 73).

While there is some speculation amongst scholars as to how the *clave* evolved from the standard bell pattern (Agawu 2006; Peñalosa 2009: 221) there are a number of important correspondences. Consider the following illustrations (figures 4.10a and b), which attempt to identify the similarities between the Cuban *son* and *rumba claves* and the standard bell pattern, respectively. In figure 4.10a, the *claves* are notated in 12/8, the various strokes of the pattern occupying the eighth-note positions that correspond most closely to the positions they would hold in 4/4. Similarly, in figure 4.10b, the standard bell pattern is notated as though in 4/4, the strokes of the pattern occupying the eighth-note positions that correspond most closely to the positions they would hold in 12/8.

Figure 4.10a – Standard Bell Pattern and Rumba and Son Claves in 12/8

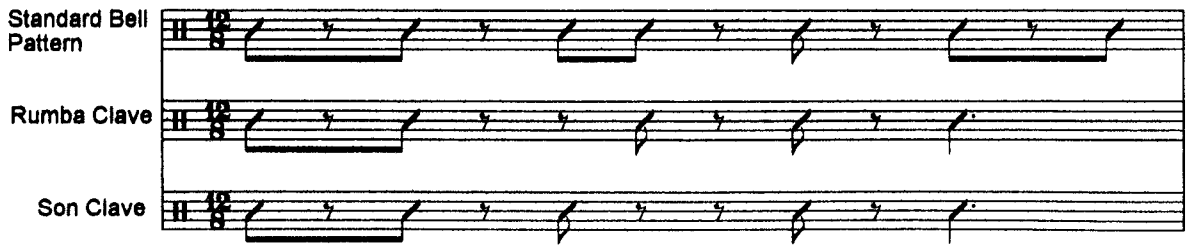
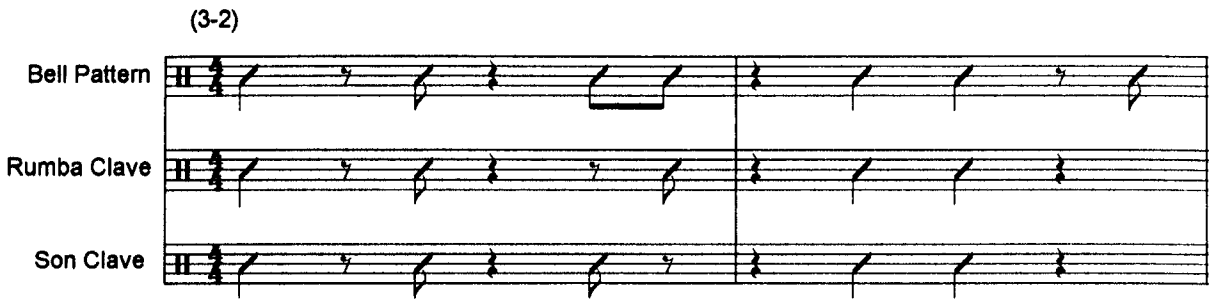


Figure 4.10b – Standard Bell Pattern and Rumba and Son Claves in 4/4

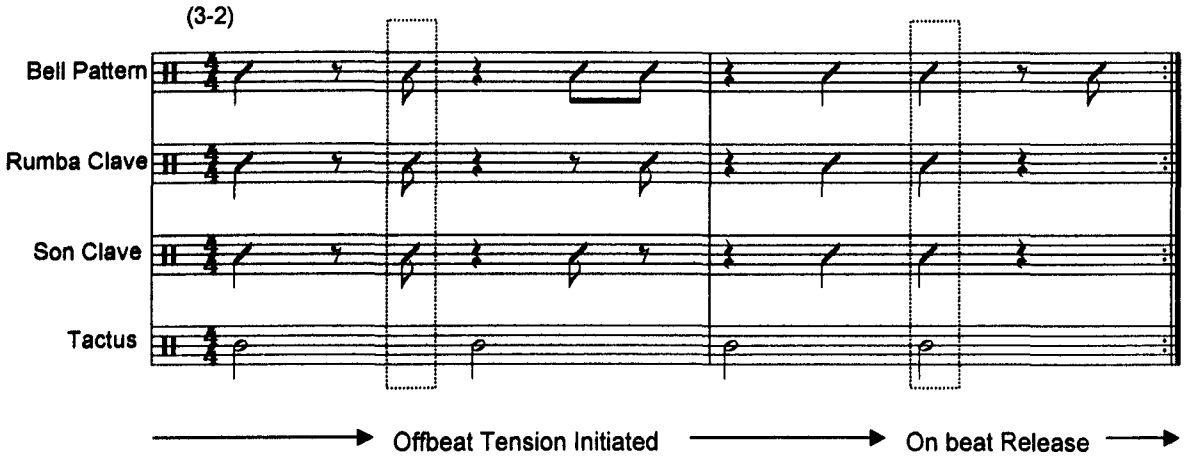


(Adapted from Peñalosa 2009: 112)

As indicated in figure 4.10a, when notated in 12/8 the differences between the standard bell pattern and *rumba clave* are the omission of strokes 3 and 7, and the differences between the standard bell pattern and *son clave* and the omission of strokes 4 and 7. When these same patterns are notated over two bars and rhythmically transposed from 12/8 to 4/4 (figure 4.10b) their interrelatedness is strikingly evident: the rhythmically transposed bell pattern contains both *son* and *rumba clave* patterns and the pattern of long and short pulses is very similar.

Minor differences aside, these widely used rhythmic patterns all perform a similar timekeeping and structural function in many Central and West African and Cuban dance musics. Arguably, a further unifying feature of these patterns is that they embody a crucial tension-and-release dynamic that helps to generate a sense of energy and dynamic forward momentum within the music. How might this dynamic work? The first *clave* stroke coincides with the first tactus beat, thereby initiating the pattern and creating a sense of stability. The second *clave* stroke coincides with an offbeat thus introducing an element of syncopation, which has the effect of destabilising the pattern and creating a sense of tension. Subsequent *clave* strokes are off the beat, which serves to reinforce the feeling of tension.

Figure 4.11 – Tension and Release in the Transposed Bell Pattern and Son and Rumba Claves



(Adapted from Peñalosa 2009: 29)

As indicated in figure 4.11, this tension finds resolution when the final *clave* stroke coincides with the fourth tactus beat. The full power of this tension and release is realised when the *clave* pattern is continuously repeated throughout a song, creating a cyclical dynamic that juxtaposes on-beats with off-beats, stability with instability and conflict with resolution. Writing of the powerful effect of the tension-release dynamic combined with repetition in the West African standard pattern, Agawu theorises that:

> the second sounding of [stroke] 1, although it provides a measure of resolution, does not, as it were, give the listener sufficient time to take in the discharge because it is soon beset by another disruption as the pattern repeats...the pattern emerges as charged, as pregnant with a cumulative dynamism that spills across the material boundaries of each cycle and keeps the music going (Agawu 2006: 10).

Similar assertions have been made in Cuban musical contexts. Peñalosa, for example, describes how a central tenet of the *clave* concept is its binary sequence: "rhythmic tension is generated in the first half of the clave and resolved in the second half", and this built-in dynamism is juxtaposed in a repeated "call-and-response or antecedent-and-

consequent sequence" (Peñalosa 2009: 104; see also Cornelius and Amira 1992: 23; Spiro 2006: 14).

Researchers concerned with the psychological aspect of music performance offer a tantalizing glimpse as to what might underpin this dynamic. Musicologist Justin London argues that African standard bell patterns are "cyclical gestalts" (London 2004: 129) whose binary design taps into the fundamental features of human cognitive systems, systems that show a preference for well-formed, regularised and even patterns. The power of the bell pattern lies in its ability to grab continually our "attentional energy" as we seek a resolution to the tension initiated at the start of each repeated pattern. According to London's interpretation, this preference is influenced by everyday rhythmic and cyclical behaviours such as "speech production and comprehension, our auditory and visual tracking of moving objects, and, most importantly, kinematic or motor control behaviours from walking and running to dancing and participating in sports" (London 2004: 144).

Making a similar gestalt-influenced assertion, Jeff Pressing argues that West African time lines and Cuban *clave* patterns manipulate our expectancy by establishing a "perceptual rivalry" between the underlying tactus and the syncopated strokes. Further, the more syncopated strokes in the pattern, the more the perceived tension and expectancy: "the degree of syncopation indicates the degree of cognitive complexity or dissonance set up by the pattern-ground relation" (Pressing 2002: 301). This perceptual rivalry, according to Pressing, is an arousing process because it sets up a contradiction between the different rhythmic interpretations, increasing engagement and focussing attention. Similar to non-musical cyclical visual and auditory effects (Pressing uses the spinning barber's pole as an example of the former), once placed in a repeating tension-release cycle, the alternation between the two interpretations that are in contradiction is continuously maintained, "creating an anomalous, energizing percept that can be clarified by reasoning,

but not banished" (Pressing 2002: 298) and helps to achieve "intensification of engagement and attention" (Pressing 2002: 289).

Like London, Pressing argues that these temporal musical effects tap into anticipatory features of human cognitive systems, particularly those features used in prosody, conversational interaction, narrative and competitive sports (Pressing 2002: 299). Pressing extends his theorisation beyond the cognitive and perceptual realm, suggesting that temporal musical effects found in *clave*-based music may account for the social, communal and emotional nature of participatory musical events:

> Perceptual rivalry creates arousal and has emotion-generating power, helping to account for African and African diasporic rhythm's effectiveness in engagement in general and its capacity for facilitating impact in consciousness alteration, communal ceremonies, social cohesion, communication of emotional patterning, movement expression, and catharsis (Pressing 2002: 308).

These theorisations help to explain why some Cuban scholars and musicians alike argue that the *clave* is always a 3-2 concept. If the *clave* is reversed to 2-3, a pattern of release followed by tension is created, thus diminishing the inherent dynamic force that is central to the design (Mauleón 1999: 7; Peñalosa 2009: 158, 249). If the 3-2 dynamic of the *clave* is to be considered primarily responsible for, as the above evidence suggests, engaging and focussing attention and creating a sense of participation that is paramount for a feeling of social cohesion at communal events, one key question remains unanswered: to what degree are these effects cross-cultural and to what degree are they context-specific? This is a particularly pertinent question when the case of *salsa* is considered, a *clave*-based dance form that continues to unite people from markedly different cultural backgrounds around the world in celebratory music and dance. Furthermore, when these

arguments are considered in relation to notions of groove, they suggest that the tension-release dynamic embodied in the 'half note pulse *clave* model' is one vital component that contributes to the perceived motion-like dynamic rhythmic energy, emotional arousal, and sense of engagement and participation that characterise the groove of Cuban dance music performance (see chapter 1).

To summarise, the *clave* is a powerful, important and pervasive cultural model within Cuban and Cuban-related musical traditions. Within these traditions, the *clave* plays an important structural and timekeeping role guiding the rhythmic activities, aesthetic choices and judgements, and interactive behaviours of instrumentalists, singers and dancers during performance. Additionally, understanding how to play 'in *clave*', and marking and feeling the tactus in half notes against the *clave*, can act as strident markers of musical competence, authenticity and Cuban-ness. The 'half note pulse *clave*' model also embodies a powerful cyclical tension-and-release dynamic that juxtaposes off-beat conflict with on-beat resolution. This dynamic has the ability to grab a listener's attention and inject a sense of dynamic rhythm energy and motion into the groove of the music, and, according to some scholars, has the ability arouse emotions and provoke engagement and participation in communal music making events.

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Chapter 5

Tumbaos: The Rhythmic-Harmonic Framework of Groove

This chapter builds on the arguments presented in previous chapters. In chapter 3, it was argued that the *sabor* aesthetic was partly reliant upon, and constrained by, the polyrhythmic framework within which musicians interact, and in chapter 4, I argued that one specific rhythm pattern, the *clave*, formed the structural basis of that polyrhythmic framework. The aim of this chapter therefore is to detail the other important rhythmic and harmonic patterns (or *tumbaos*) that combine with the *clave* to form the rhythmic-harmonic framework within which groove is generated and aesthetic judgements are made.

In order to achieve this aim, the following discussions draw on the opinions of performing musicians, arguments and ideas from scholars that study Cuban and Cuban-related African-American musics, and educational and instructional literature that details aspects of the rhythmic and harmonic patterns and performance structures within the Cuban musical tradition. After discussing the terminology used by musicians and authors to describe groove and *tumbaos*, the role of the rhythm section in groove production is considered, followed by a more technical discussion of the dynamics and key rhythmic and harmonic features that contribute to the groove and aesthetics of *son* and salsa.

Terminology and Meanings: Groove, Sabor and Tumbaos

Groove is a term perhaps most strongly associated with jazz (Berliner 1994; Doffman 2008; Monson 1996), where it seems to have originated (Kernfeld 2011). In these contexts, groove is used broadly by musicians to describe the "rhythmic feel" of music (Monson 1996: 1). More specifically, the term can have multiple meanings, simultaneously referring to individual patterns played by instrumentalists that combine to form the rhythmic-harmonic framework or "rhythm matrix" (Monson 1996: 67; see also Middleton

1999: 143) of groove, the interactive timing relationship between instrumentalists (Doffman 2008) and the interpersonal, emotional and aesthetic qualities associated with ensemble groove production (Berliner 1994; Monson 1996).

Groove has also been used by musicians to describe the rhythmic qualities of other African-American musics, such as soul, funk, disco and hip-hop (Danielsen 2006; Hughes 2003; Redtenbacher 2011), by scholars in the investigation of salsa (Waxer 2002a; Washburne 1998) and Afro-Brazilian samba (Gerischer 2006), as well as by US educationalists when detailing the rhythmic principles underlying Afro-Cuban musics (Goines and Ameen 1990; Peñalosa 2009). An array of synonymous terms have also been used by musicians, researchers and educationalists to describe the rhythmic feel of music: swing (Prögler 1995: 21), vital-drive (Keil 1994 [1966]: 59), 'hook up' (Monson 1996: 56) and playing 'in the pocket' (Berliner 1994: 812), to name but a few. The term groove is however perhaps most commonly used and widely understood amongst musicians in North America and Europe when discussing the rhythmic qualities and properties of African-American musical forms.

During fieldwork in Havana, it quickly became apparent that the term groove did not share the same widespread usage and understanding amongst Cuban musicians. Therefore, in the early stages of this research one of my objectives was to find a Cuban equivalent term. This was achieved through conversations with Cuban musicians living in London and discussions with musicians in Havana. The master terms that emerged from these discussions were *sabor* and swing. However, when discussing the cyclical rhythmic-harmonic patterns that comprise the rhythmic framework of Cuban dance music the term *tumbaos* was also widely used, especially during discussions of the archetypal rhythmic patterns played on the percussion, bass and *tres*/piano. Moreover, as will become apparent in the forthcoming discussions, alternative terms are used interchangeably with *tumbao*. These include: *montuno* (Cuban Spanish meaning 'from the mountains' but also

the improvised section in Cuban dance music and salsa, and archetypal rhythmic section patterns); and *guajeo* (or 'vamp'), which is broadly similar to *tumbao* but is also used to describe typical patterns and phrases played on lead instruments such as the saxophone and trumpet (Leymarie 2002; Orovio 2004; Manuel 1995; Peñalosa 2009; Perna 2005; Rodríguez 1998).

Whilst I acknowledge the interrelatedness of all these terms, for reasons of consistency and clarity groove will be used throughout the following discussions to denote the various elements that contribute to the rhythmic feel of Cuban dance music (as detailed above by Monson and others), and more specifically, *tumbaos* will be used to describe the key rhythmic patterns that form the rhythmic-harmonic framework or 'rhythm matrix' within which groove is generated. Sabor is used to describe the multifaceted nature of Cuban musical aesthetics (see chapter 3).

Groove, Sabor, Tumbaos and the Rhythm Section

Given the importance of groove within musical and academic circles, particularly with regard to dance music, I wanted to detail how performers of Cuban music and salsa verbalise and conceptualise groove. Typically, London *salsa* musicians pointed to the rhythm section when discussing notions of groove. For instance, London-based Spanish *salsa* singer Graciela Rodriguez said that, "the groove has to be everything, the rhythm section together" (Graciela Rodriguez, interview, 9/4/09). English jazz and *salsa* trumpet player Angus Moncrieff was more prescriptive and spoke of the cyclical patterns that comprise the rhythm framework of groove:

> I suppose a groove is some kind of ostinato, some kind of rhythmic figure that's repeating...the rhythmic framework, the pattern of beats that are played by the rhythm section players. That constitutes a groove to me (Angus Moncrieff, interview, 14/4/09).

Perhaps unsurprisingly given his jazz background, Angus Moncrieff conceptualises groove in a very similar way to musicians in Monson's study: as a rhythmic matrix or framework. Similarly, London-based salsa and *timba* pianist and singer EC suggested that the heart of groove lies in the rhythm section and also spoke of the role groove plays in formulating Cuban musical identity:

> Groove is, in Cuban music, it's the basis of everything, it's like the rice in the food in Cuba. If there is no rice, what the hell are you gonna cook with! It's the rice and then you can put beans and meat and salad and whatever, but if there is no rice what are you doing, you know. It's basically the mattress of everything, it's what makes the music Cuban because you can put some crazy jazz horns on top of a Cuban groove and it's still gonna be Cuban. But you can put a Cuban horn part [on a Funk tune] and it's still gonna be a Funk tune (EC, interview, 16/2/10).

EC's comment that, "groove is, in Cuban music, it's the basis of everything...it's what makes the music Cuban", makes a strong connection between notions of groove and ideas of Cuban-ness. Additionally, her comment, "that you can put some crazy jazz horns on top of a Cuban groove and it's still gonna be Cuban", suggests that the characteristic groove of Cuban music lies in the rhythm section. Later during the same interview I asked EC what makes a good Cuban groove. She explained how, as a rhythm section musician, knowing the standard *tumbaos* was not sufficient for the production of good groove; musicians also need the ability to add tasteful and appropriate variations to standard *tumbaos*.

> There's so much you can do around a groove, but groove itself it's a series of patterns and it's how you play around them, but without a good groove there is no

> Cuban music, you can't say it's Cuban music. I mean there's a lot of people here [in London] who are mistaken about what the tumbao is and they think that you just sit there, you pick up a tumbadora and you [sings typical conga pattern]. Yeah, ok that's it...or like on piano [sings typical tumbao] and the bass [sings bass tumbao] that's the basis of the groove, that is not the groove, that does not make a groove. Now show me you are a musician you know, that's the kind of thing if you don't mess around with it, if you don't put your own flavour to it everyone's gonna fall asleep, no one is gonna dance to your music. You need to put a bit of heart into it, you know. The other thing is people who just cross over the clave having no idea what they are doing. You have to know what you are doing...what makes a Cuban groove Cuban is also the interaction between musicians. If you've got the bass going like [sings tumbao with variations] and suddenly he'll go like [sings complimentary pattern] and then the guy next to him who's playing congas is like [sings another complimentary pattern] and he's gonna be like 'do that again', you know. Its little things like that where people interlock and have a certain communication going on within them, that makes a groove good (EC, interview, 16/2/10).

EC makes some extremely important points about Cuban musical performance, many of which have already been touched upon in this and previous chapters. Firstly, she states that the "basis of the groove" is the combination of key rhythmic-melodic patterns or *tumbaos* that together form the rhythmic framework, or "rhythm matrix" to use Monson's term. Secondly, her comment that "people who just cross over the clave having no idea what they are doing" echoes the discussion in the previous chapter where it was argued that the *clave* is an important cultural model within Cuban and Cuban related musical traditions that guides rhythmic activities, aesthetic choices and judgements. Thirdly, EC's use of phrases such as "you need to put a bit of heart into it", "what makes a Cuban groove Cuban is also the interaction between musicians" and that a good groove is

"where people interlock and have a certain communication going on within them" speaks directly to interactive and collectivist aspect of the *sabor* aesthetic (see chapter 3).

Cuban musicians also emphasised the role of interaction, communication and rhythm section *tumbaos* in producing a groove with *sabor*. For example, one Cuban pianist I spoke to in Spain said that groove was "the assembly between bass and percussion...when that sabor is felt, when it walks, when you feel it's like a walk...it maintains that same [rhythmic] cell" (Jorge Poutal, interview[5.1], 22/2/10). Also focussing on the role of key rhythmic patterns and their relationship to the *sabor* aesthetic, virtuoso Cuban bass player and educationalist Carlos Del Puerto said that:

> In my opinion the concept of groove in Cuban music, is what we call tumbaos, montunos, or guajeos that is produced in the rhythm section, mainly between the piano, guitar, tres and bass. When all of the rhythm section is working well, with sabor and very tight, the rest of the group react positively, and everybody begins to participate in a very active and creative way (Carlos Del Puerto, interview[5.2], 18/6/10).

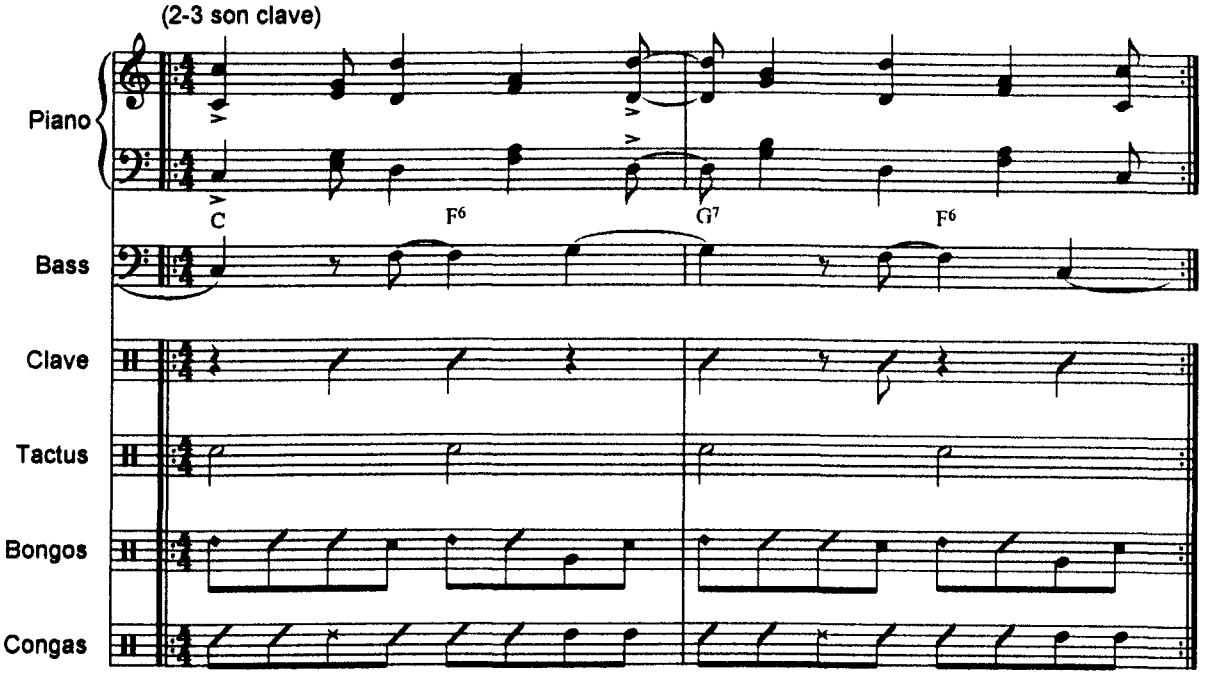
The comments of these Cuban musicians are interesting for several reasons. Jorge Poutal's metaphor about bass and percussion ("when you feel like it's a walk") speaks directly to the interpersonal, social and participatory aspects of groove and the aesthetic of *sabor*, and implies that instrumentalists are moving in time together in rhythmic and temporal synchrony. Similarly, Carlos Del Puerto's comments that when the rhythm section groove "with *sabor*" and enjoy synchronous timing relationships (i.e. "very tight"), "the rest of the group react positively, and everybody begins to participate in a very active and creative way", draws strong connections between the rhythm section, the rhythmic-harmonic framework of groove, timing and active participation. Whilst dynamics of the

interactive timing relationships between rhythm section instrumentalists and the importance of active participation in groove production form the bedrock of the investigations in future chapters, the following section examines some of the inherent dynamical features in the archetypal rhythm section *tumbaos* and how these *tumbaos* fit together to form the rhythmic-harmonic framework of *son* and salsa styles.

Tension and Release in Rhythm Section Tumbaos

Figure 5.1 shows the standard rhythm section *tumbaos* commonly used in the *montuno* section of modern *son* and *salsa* styles. Although there are many stylistic variations and adaptations, these *tumbaos* represent the essential elements that characterise the rhythmic-harmonic framework of *son*, salsa and related styles (Mauleón 1993, 1999).

Figure 5.1 – Standard Tumbao Patterns used in Son and Salsa Montunos



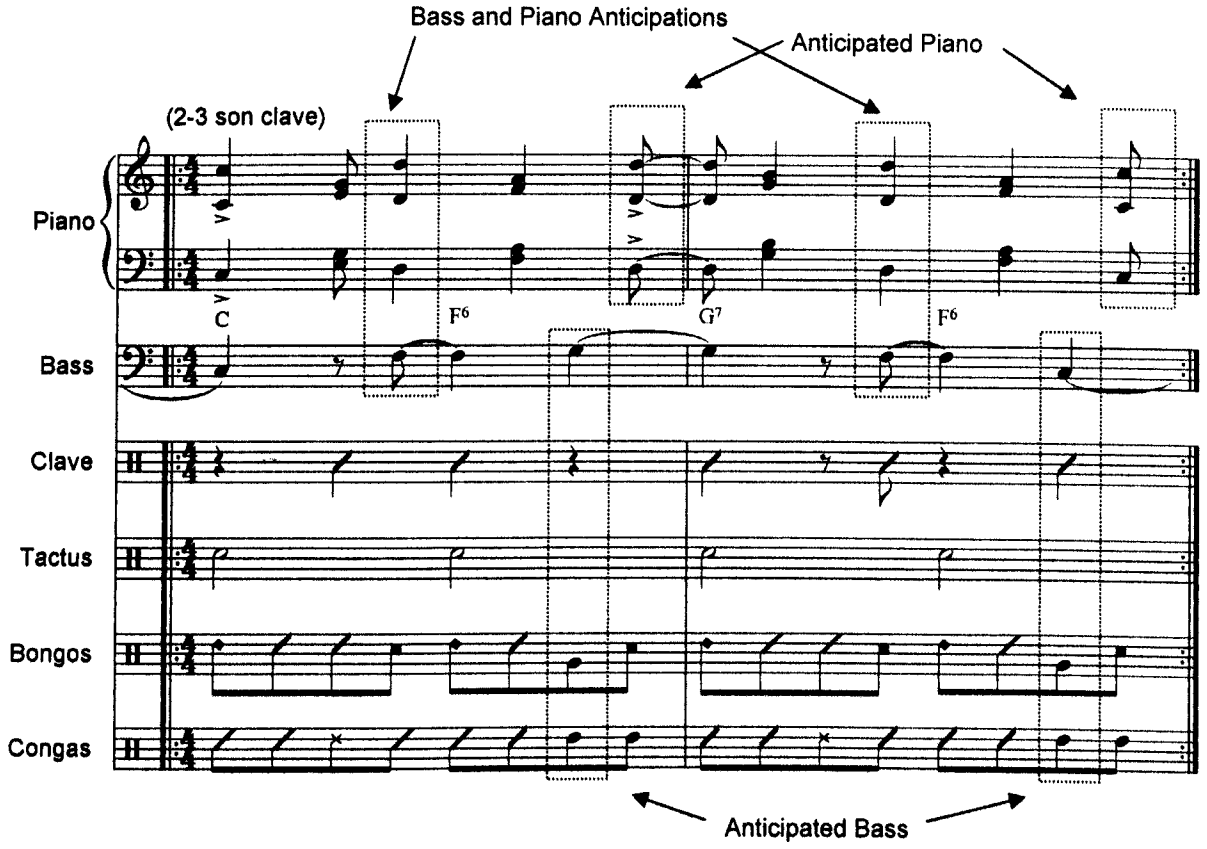
(Adapted from Mauleón 1993: 201)

The bass *tumbao* shown in figure 5.1 is often referred to as *bajo anticipado* or anticipated bass, and is, writes ethnomusicologist Peter Manuel, "perhaps the single most distinctive feature of Afro-Cuban popular music, and its origin is unique to that set of genres and their

derivatives" (Manuel 1985: 249; see also Del Puerto and Vergara 1994). Along with other key rhythmic patterns such as the *clave,* the bass *tumbao* forms "the heart of the ensemble...a repeated figure (either on congas or bass) which creates the groove" (Goines and Ameen 1990: 6). Like the *clave*, the bass *tumbao* embodies a crucial and characteristic tension-and-release dynamic. By placing a bass note on the fourth quarter note of each bar, tying that note across to the next bar and thereby deliberately avoiding beat one, the bass anticipates the harmonic change played on the other harmonic instruments (e.g. piano or *tres*). The resultant effect of this momentary rhythmic-harmonic anticipation "can be said to create a tension and a desire for the corresponding harmony of the next bar. At the same time, the weak stressing of the downbeat, when it does arrive, undermines its potentially cadential effect, such that the rhythm in effect 'rides over' the down beat" lending "the rhythm a unique flow and momentum which make it ideal for the supple and fluid *salsa* dance style" (Manuel 1985: 255).

This anticipatory effect is enhanced by the typical piano *tumbao*, which also anticipates the harmonic change by placing an emphasis on the last eighth note of each bar, one eighth note after the bass. Manuel (1985: 255) describes this combined bass-piano effect as "staggered anticipation", which, he argues, further undermines a sense of cadence in modern *son* and salsa styles. A similar type of anticipatory effect, created by the combined bass and piano *tumbaos*, is also present on the fourth eighth note of each bar. As can be seen in figure 5.2 below, at this point in the rhythmic-harmonic sequence the bass and piano are playing an F6 chord together, thus creating an additional anticipation that "rides over" beat three. These combined anticipatory effects also have an important relationship to the tactus, or primary pulse, which falls on beats one and three (see chapter 4). The syncopated rhythmic-harmonic interplay between the bass and piano *tumbaos* anticipate the more grounded and fundamental beats marked by the tactus, helping to create a groove that has a perceived sense of rhythmic energy, drive and forward momentum. All of the aforementioned anticipatory effects are summarised below in figure 5.2.

Figure 5.2 – Anticipations in Standard Rhythm Section Tumbaos



It has been argued that similar types of rhythmic-harmonic anticipatory effects underpin the grooves of other African-American musical forms. For example, in his seminal article, *Motion and Feeling through Music*, Keil writes of a similar phenomenon in jazz swing rhythms, describing how the pulse provides "resting points" against which anticipated syncopations provide "resistances", "uncertainties" and "tensions". These between-the-pulse articulations, asserts Keil, engender an embodied feeling of "vital drive" that propels the music forward in sonic motion (Keil 1994 [1966]: 73-74). Making a similar point in her analysis of the funk grooves of James Brown and Parliament, musicologist Anne Danielsen remarks on how the anticipated syncopation of the main pulse by the bass and guitar riffs in James Brown's 'Sex Machine' creates a "destabilising effect" that, when repeated, continuously pulls the music forward:

> The bass line never settles down on the strong beats, spreading its energy instead both before and after them...the bass line points to the positions of the 4/4 pulses

> but never marks out exactly where they are. In this way, the gestures of small notes surrounding heavy beats are able to ground the groove without making the strong beats too articulated; the energy is always led away by afterbeats...none of them is as strikingly full of tension in relation to the following strong beat as the offstroke of the guitar riff. However, all these pick-ups to the beats have a similar effect, in that they keep the groove in motion through the positions where musical forces are pulling "downward". They point out the significant beats of the pulse without accentuating them. When the various riffs arrive at a main beat, it has in a sense already passed. One is always heading for new (pre)beats (Danielsen 2006: 80).

Both Keil and Danielsen draw connections between the anticipatory effects inherent within the rhythmic-harmonic frameworks of jazz and funk, notions of groove and the characteristic energy and drive of the music. In Cuban musical contexts, this phenomenon manifests itself in subtly different ways. Having spent many performance hours playing anticipated bass *tumbaos*, tapping the tactus beats with my foot and locking into the pianist's *tumbao,* my experience is that, so far as the bass in concerned, the anticipation leading to beat one seems to be more exaggerated and has a more pronounced presence then the anticipation leading into beat three. The anticipation of beat three feels more like a momentary lift, is more fleeting and appears to skip quickly over the beat, whilst the anticipation of beat one seems to have more emphasis and a greater sense of momentum. A London-based English jazz and *salsa* pianist, who I have shared many hours experiencing these types of groove with, offered his opinion on the subject:

> Well, the four is so important because it seems to me the four is really what gives it that movement...it's definitely that tension and release thing that you get in all forms of music. With this it's a two-bar structure. It sort of leads to that four. It's such a simple thing theoretically. You know you've only got two different beats

there, two-and and four, so there's a reason why it works, it's not just coincidence that every bass player plays that. It's such an important groove, it's such an amazing thing (Hamish Balfour, interview, 9/4/09).

Similar to Keil, Danielsen and Manuel, Hamish Balfour draws clear connections between the anticipatory offbeat effects inherent within elements of the rhythmic framework (i.e. the anticipated bass), notions of groove, and the characteristic "movement" and "tension and release" of certain African-influenced Cuban related musics. Furthermore, his comment that "with this it's a two bar structure. It sort of leads to that four...the four is really what gives it that movement" suggests that his experiences concur with mine, in that the fourth quarter in each bar appears to have more weight, emphasis and syncopated energy.

The examination of certain other features inherent in the rhythmic framework of Cuban dance music helps to explain this phenomenon. Firstly, the anticipation of beat three creates rhythmic tension but not harmonic tension: this is because the bass and piano are both playing the same chord notes at the same time – an F6 chord in the example shown in figure 5.2. By contrast, the anticipation of beat one is a source of combined harmonic and rhythmic tension due to the aforementioned "staggered anticipation". Secondly, pianists typically accent the last eighth note on the two-side of the *clave* to enhance further the anticipatory effect (Mauleón 1999). Thirdly, percussion *tumbaos* reinforce the bass-piano anticipation of beat one but not the anticipation of beat three. As can be seen in figure 5.2, the *bongó* plays open tones on the *hembra* (low-pitched drum) on the fourth quarter note of each bar with the bass. The *congas* also play open tones on the fourth quarter note with the bass and *bongó* and on the last eighth note with the piano. These features within the percussion *tumbaos* provide increased accentuation as, in contrast to the more frequently played muted tones, low-pitched open tones are naturally more full, strong and resonant, with greater sonic presence (Cohen and Madera 1974; Spiro 2006).

It is likely that there are differences in feel between the anticipation of beat one on the two-side of the *clave* and the anticipation of beat one on the three-side. On the three-side the bass note corresponds with a *clave* stroke and typically, at this point in the sequence, the bass plays the lowest note in the bass part (see figure 5.2). Perhaps these features create subtle differences in feel between the two- and three-side of the *clave*, with the three-side feeling more accentuated and, like the low-pitched open tones in the percussion *tumbaos*, naturally more full, strong and with greater sonic presence. This point is speculative, but what is evident from the above arguments is that these subtle, momentary and combined anticipatory features inherent within the rhythm section *tumbaos* appear to help in the production of a groove that has a perceived sense of dynamic tension and release, lift, energy and continuous forward motion and drive. The final section in this chapter considers another facet of this tension-and-release dynamic: the interplay between the piano *tumbao* and the *clave*.

Tension and Release in the Clave and Piano Harmony

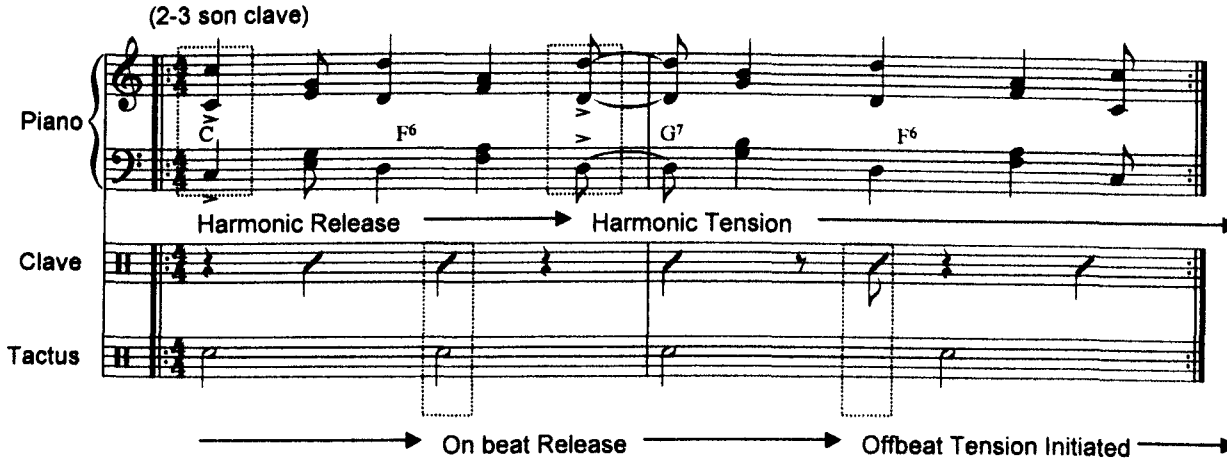
In chapter 4, I argued that the *clave* is a powerful cultural model within Cuban and Cuban-related musical traditions, which guides rhythmic activities, aesthetic choices and judgements. Furthermore, that the *clave* embodies a cyclical tension-and-release dynamic that juxtaposes off-beat conflict on the 'three-side' with on-beat resolution on the 'two-side'. The rhythmic tension and release within the *clave* therefore, has an interesting relationship to the harmonic tension and release found in the piano *tumbao*.

As ethnomusicologist and *salsero* Christopher Washburne points out in his analysis of *salsa* piano, typical piano *tumbaos* "tend to alternate every other measure between anticipating the harmonic change one eighth note before the downbeat and supporting the harmonic change on the downbeat" (Washburne 2002: 107). An example of the

alternating pattern to which Washburne refers is shown in figure 5.3. Here, the piano plays a C chord on beat one of the first bar and anticipates the G7 chord leading into bar two by one eighth note. From a western harmonic viewpoint, this makes perfect sense: the downbeat in the first bar marks the start of the harmonic sequence by supporting the sounding of the tonic chord (C), and tension is introduced with the sounding of the dominant chord (G7) one eighth note before the second bar. Therefore, when repeated, the typical I-IV-V7-IV sequence can be said to add an additional layer of tension and release to the groove, as the dominant G7 seventh chord, followed by the F6 sub dominant chord, naturally provide harmonic tension that seeks resolution to the tonic C chord (according to the cadential principles of traditional diatonic harmony). In this case, the presence of the F6 chord between the dominant and tonic could be said to weaken the harmonic cadence. However, when heard there is still a cadential effect. Other typical harmonic sequences used in *montuno* sections provide a more traditional V-I diatonic cadence (see Mauleón 1999).

This alternating harmonic tension and release in the piano *tumbao* broadly coincides with the rhythmic tension and release of the *clave* as detailed in chapter 4, where the three-side initiates the tension and the two-side resolves that tension. Figure 5.3 shows the corresponding harmonic/rhythmic tension and release in the piano *tumbao* and *clave* sequence.

Figure 5.3 – Tension and Release in the Piano Tumbao and Clave



Although there is a slight discrepancy in tension-release alignment between the piano *tumbao* and the *clave*, the piano *tumbao* still adheres to the general binary structure of the *clave*, in which the three-side is the tension/call or antecedent half while the two-side is the release/response or consequent half. However, if one accepts the argument, made by many scholars and musicians, that to preserve the tension-and-release dynamic within the *clave* sequence it must always by played in a 3-2 direction (see chapter 4), then an anomaly becomes apparent. In the case of the 2-3 sequence shown in above figure 5.3, the dynamic is reversed: the release/response or consequent half appears first in the sequence followed by the tension/call or antecedent half.

The reason for this anomaly is that, in styles that are more orientated toward *son* and *salsa* the harmonic progression rather than the rhythmic progression often takes precedence. This precedence appears to be pervasive: as Rebeca Mauleón points out in her detailed survey of piano *tumbaos* (she uses the term *montunos*), typical I-IV-V7-IV (major or minor) harmonic progressions are always 2-3, with the tonic chord on the two-side and the dominant on the three-side (Mauleón 1999: 39)[15]. Peñalosa makes the argument that the harmonic precedence found in Cuban popular music represents different attitudes to the *clave,* and that these *clave* attitudes are important markers of stylistic and contextual difference within the Cuban musical tradition:

> There is an important difference between folkloric and clave popular music regarding the concept of "one", at the beginning of the cycle, and that difference affects how we think about the rhythmic structure and how we represent it on paper. In a folkloric context, the "one" is always the first beat of the three-side, but

[15] Other typical harmonic sequences widely used in *montuno* sections of Cuban popular music are I-V-V-I, II-V-I (major or minor) or dominant pedals on a V7 chord. These types of harmonic sequences can be played in a 2-3 or 3-2 direction and over one *clave* or two *clave* cycles (see Mauleón 1999). Here the release-tension anomaly is less pronounced, or perhaps it manifests itself in a different or more abstract fashion.

> it's not proper to say "Everything is 3-2 in folkloric music". The 3-2/2-3 concept is not a factor; neither African, nor Cuban folklorists use this concept or terminology. If a vocal or instrumental part begins on the two-side, it simply has entered halfway thought the [clave] cycle (Peñalosa 2009: 158).

By "folkloric" music, Peñalosa is referring to the more African-orientated Cuban styles like *rumba* (*yambú* and *guaguancó*) and Cuban music of Yoruban and Congolese descent, whilst "popular music" denotes more European-orientated styles like *son*, *salsa* and latin jazz. Conceptually, according to Peñalosa, folkloric music, which uses the rhythmic sequence as the primary referent, is always 3-2. Whereas popular music, which uses the harmony sequence as primary referent, can be conceptualised as either 3-2 or 2-3. Peñalosa surmises that: "in popular music harmony trumps rhythm" (Peñalosa 2009: 136).

As well as being an important marker of style and context, Peñalosa's argument also suggests that *clave* attitudes may be indicative of the tensions between the African and European cultural forces that have shaped popular Cuban dance music, an argument made by many Cuban music scholars (León 1991: 21; Fernandez 2006: 37-38; Furé 1991a: 35; Moore 1995: 182). The contention is that as one moves along the stylistic continuum from more African-influenced "folkloric" to more European-influenced "popular" styles, the harmonic sequence, rather than the rhythmic sequence, becomes the primary referent. From a groove perspective, this is an important implication as it suggests that the apparent release-tension anomaly embodied in the 2-3 rhythmic/harmonic concept found in *son* and salsa styles, results in dance music with a subtly different energy and feel to other more folkloric Cuban styles, and with a slightly different aesthetic and unique sense of forward motion. As Peñalosa writes:

> In 2-3 music the harmonic progress makes the three-side feel like the consequent half of the clave, rather than the first half. The two progressions (harmonic and rhythmic) are therefore opposed to each other and produce a type of "contrary motion" (Peñalosa 2009: 136).

It is intriguing to consider Peñalosa's assertion of 'contrary motion' in the groove of *son* and salsa styles in light of arguments presented by music psychologists in chapter 4, where it was suggested that tension and release in cyclical rhythmic patterns such as the *clave* tap into the fundamental features of human cognitive systems, grab our "attentional energy" and have the ability to intensify engagement and attention. Furthermore, these musical effects found in *clave*-based musics such as *son* and salsa help to account for the social and communal nature of participatory musical events. Perhaps then, the unique blend, balance and interplay between the African-influenced rhythmic tension and release found in the *clave,* and more European-influenced harmonic tension and release found in the piano *tumbao*, help to generate a groove that is more aesthetically pleasurable and has a wider cross-cultural appeal?

In order to cast some light on this far-reaching claim, it is useful to consider the arguments of scholars who study the emotional effects associated with tension-and-release dynamics in music. In his influential book, *Emotion and Meaning in Music*, Meyer (1956) draws on examples taken from a range of musical traditions – e.g. Western classical, Indian classical, African, Javanese and jazz – to develop the argument that the perceived musical effects of rhythmic/harmonic tension and release are powerful because they tap into analogous feelings, perceptions and responses experienced in real life. Using as a real life example, the suspense, apprehension and anxiousness felt when awaiting the breaking of a formidable storm, Meyer argues that the greater the tension the more powerful the emotional effect on release:

> The greater the build up of suspense, of tension, the greater the emotional release upon resolution. This observation points up the fact that in aesthetic experience emotional pattern must be considered not only in terms of tension itself but also in terms of progression from tension to release. And the experience of suspense is aesthetically valueless unless it is followed by a release which is understandable in the given context.
>
> Musical experiences of suspense are very similar to those experienced in real life. Both in life and in music the emotions thus arising have essentially the same stimulus situation: the situation of ignorance, the awareness of the individual's impotence and inability to act where the future course of events is unknown. Because these music experiences are so very similar to those existing in the drama and in life itself, they are often felt to be particularly powerful and effective...both music and life are experienced as dynamic processes of growth and decay, activity and rest, tension and release (Meyer 1956: 28, 261).

Meyer wisely acknowledges the culturally codified nature of these musical and real-life experiences, which suggests that there are limits to their universal appeal. Further caution is needed when directly applying Meyer's ideas to groove-based musics, as it is unclear if he is referring to the same types of cyclical musical structures and relatively small time-spans found in two-bar *clave* sequences. However, his arguments are interesting and intriguing as they suggest a connection exists between the tension-and-release dynamic in music and the powerful emotional responses elicited by that dynamic. The aforementioned arguments are particularly intriguing when considered in relation to the groove found in salsa, a music style that has enjoyed considerable international appeal, has been enthusiastically received in diverse locales around the world and continues to unite people in emotionally-laden music making and dance (an issue explored in greater detail in chapter 9).

To summarise the main points in this chapter, the various cyclical *tumbaos*, played within the rhythm section, form the basis of the rhythmic-harmonic framework within which groove in generated. This framework and the groove it helps produce play a central role in the formulation of Cuban musical identity and is a distinctive and powerful cultural model that serves to guide rhythmic activities, aesthetic choices and judgements within Cuban and related musical traditions such as *son* and salsa. Certain rhythmic-harmonic anticipatory effects embodied within rhythm section *tumbaos* combine to produce a characteristic tension-and-release dynamic, a dynamic which, when repeated, adds a perceived sense of forward motion, energy and drive to the groove. The dynamic within the rhythmic-harmonic framework of *son* and salsa styles manifests itself in a unique manner, perhaps providing a sense of 'contrary motion', born from the anomaly between the "one" of the 2-3 harmonic progression of the piano *tumbao* and the "one" of 3-2 rhythmic progression of the *clave*. As well as acting as an important marker of style and context, the characteristic dynamic found in Cuban *son* and salsa grooves may also have powerful aesthetic and emotional consequences in so far as it is analogous to feelings experienced in everyday life.

The generation of groove with *sabor*, as several musicians remarked towards the beginning of this chapter, is not however simply a matter of playing rhythm section *tumbaos* in a textbook fashion: groove is also a product of the interactive timing relationships between rhythm section instrumentalists. It is to these timing relationships that the discussion now turns.

Chapter 6

Rhythm Section Timing and Entrainment

In previous chapters, it was argued that one important aspect of groove in Cuban *son* and salsa styles was the tension-and-release dynamic and anticipatory effects embodied within the cyclical *tumbaos* that form the basis of the rhythmic-harmonic framework of the rhythm section groove. This chapter aims to explore an equally important dimension of rhythm section groove: the timing relationships between instrumentalists. Specifically, this chapter makes use of micro-timing and statistical data taken from three different performances to investigate how the roles played by certain rhythm section instruments might influence real-time interactive behaviours and collective groove production.

In order to achieve this aim, the discussion proceeds in four main sections. First, entrainment theory is considered, followed by a literature review of some relevant applications of this theory in the disciplines of sociology, anthropology and cognitive psychology. Second, connections are then explored between notions of entrainment, related theories of groove in ethnomusicology and empirical approaches developed for the analysis of micro-timing and groove. Third, the role of rhythm section instruments in Cuban and Cuban related-styles is discussed and, lastly, transcriptions and micro-timing and statistical data, taken from the *montuno* sections of *son* and salsa performances, are presented and discussed in detail.

The Concept of Entrainment

Entrainment can be thought of as an interaction between two or more self-sustaining oscillators, or rhythmic entities: "entrainment describes a process whereby two rhythmic processes interact with each other in such a way that they adjust towards and eventually 'lock in' to a common phase and/or periodicity" (Clayton et al 2005: 5). A number of

scholars have used alternative terms to entrainment: 'sync' (Strogatz 2003: 2); 'interactional synchrony' (Condon 1986: 56); and 'attunement' (Jones and Boltz 1989: 470). Regardless of terminological differences, these scholars are all broadly describing the same phenomenon, that is, the rhythmic interplay between two or more independent interacting entities.

The entrainment concept dates back to 1665 when Dutch physicist Christiaan Huygens was trying to develop navigational pendulum clocks that could accurately determine longitude at sea. He noticed that if two clocks were hung from a common support (a wooden plank and two chairs) the pendulums would, even if deliberately disrupted, repeatedly swing in sympathy with each other within a time frame of half an hour (Pikovsky et al 2003: 1-3; Strogatz 2003: 104-108). He deduced, by further experimentation, that the 'sympathetic clocks' were interacting through tiny vibrations in the wooden support. Huygens' ideas formed the basis of what came to be known as entrainment. These ideas have had a direct influence on a diverse array of disciplines (physics, biology, linguistics, psychology, mathematics and sociology) and have been employed in a range of different research applications that seek to explore the rhythmic nature of interactional and synchronous behaviour. These include the analysis of traffic flow patterns, audiences clapping in synchrony in concert halls, fireflies flashing in unison, the coordination of women's menstrual cycles, rioting and the 24-hour circadian sleep cycle (Strogatz 2003).

Although entrainment may manifest itself in different ways within these different disciplines, the common theme that emerges from these studies is the notion that there is a universal tendency of rhythmic entities within biological, mechanical and social systems to interact and achieve a synchronous and harmonious state. As one aspect of the present research is to explore the interactive timing relationships and synchronous musical behaviours of instrumentalists and to investigate how these behaviours might

shape collective groove production, the following section explores some of the findings from the application of entrainment theory in disciplines that are arguably most directly applicable to groove. Specifically, I explore the application of entrainment theory in the areas of sociology, anthropology and cognitive psychology.

Some Applications of Entrainment Theory

In his book, *The Dance of Life: The Other Dimension of Time*, anthropologist and cultural theorist Edward T. Hall (1989) explores how time, rhythm and the process of entrainment are pervasive and guiding forces that shape many aspects of culture and human interaction. Drawing on the work of his colleague and fellow entrainment theorist and philosopher William Condon, Hall argues that different cultures develop a characteristic sense of time and rhythm that becomes deeply embedded in an individual's social and personal life, and will be adhered to by most members of that culture (Hall 1989: 190). The development of this shared rhythmic sense may begin very early in life, with the myelination of the auditory nerve in the unborn infant, around six months after conception. Immediately following birth, "the newborn infant will move rhythmically with its mother's voice and will also synchronize with the voice of other people, speaking any language!" (Hall 1989: 177; see also Bernieri et al 1988; Trevarthen and Aitken 2001; Trevarthen 1999-2000). The infant's innate ability to synchronise with speech rhythms heard in the surrounding environment – or as Condon (1986: 68) puts it, the "biological preparedness for speech and human communication" – becomes culturally specific as the infant develops and interacts more fully with dominant speech patterns: "which [speech] rhythm one uses...is a function of the culture of the people who are around when these patterns are being learned" (Hall 1989: 177).

Once learnt, Hall argues, these culturally specific speech rhythms are a powerful bond that help tie groups of people together and can form the basis of a collective group identity. Hall extends his argument to include, not only speech rhythms, but also culturally

prescribed gestural patterns used during interactional conversation. Of this phenomenon, he writes:

> The power of the rhythmic message within the group is as strong as anything I know. It is one of the basic components in the process of identification, a hidden force that, like gravity, holds groups together (Hall 1989: 184).

Entrainment may be a key process in the development of these culturally specific rhythms by binding people together during rhythmic interaction and communication. Hall (1989) and Condon (1986) both present arguments that suggest this is the case. Firstly, they propose that the most effective interaction occurs when two or more enculturated individuals adjust and lock their rhythmic behaviours together to create a shared temporal order. Secondly, they propose that the ability to entrain with others and to participate in this shared temporal order is fundamental to interaction. Condon writes that "an ability to participate within a shared order seems to be essential for interaction" (Condon 1986: 74), while Hall states that "without the ability to entrain with others...life becomes almost unmanageable" (Hall 1989: 177), "if you can't entrain, you can't relate" (Hall 1989: 183).

In a related study, social psychologists McGrath and Kelly have developed a "social entrainment model" in which human interaction and behaviour is understood through four integrated components: *rhythm, mesh, tempo* and *pace* (McGrath and Kelly 1986: 83-103). *Rhythm*, in the context of McGrath and Kelly's model, refers to a set of multiple, cyclical and endogenous temporal processes that influence a host of an individual's expressive behaviours, such as speed of oral reading, writing, walking and turn taking during conversation. *Mesh* describes the process of mutual entrainment between members of a social system, in which they adjust their activity patterns to coordinate with another during social interaction. *Tempo* refers to the resultant "negotiated temporal order" that arises as members of the social system adjust their own rhythmic patterns to

create a balance state or "dynamic equilibrium". Finally, *pace* describes the influence that external rhythmic events exert on the dynamic interactions between members of the social system. Such external temporal patterns might be inherent to the organisation, institution or working environment, or a feature of the overarching social and cultural system.

Like Hall and Condon, McGrath and Kelly's theorisations place time, rhythm and the dynamic processes of entrainment at the centre of human sociality. They conclude that:

> During a period of social interaction, the members of that social system must work out a "negotiated temporal order" in which they adjust their activity patterns to coordinate with one another...patterns of the members become coupled, or coordinated, or *mutually entrained*, with those of other members of the social system. The multiple independent cycles of activity of the members of the social system become coordinated with one another into a temporally patterned system of activity that is characterized by a dynamic equilibrium rather than by a fixed homeostatic pattern (McGrath and Kelly 1986: 89-90).

The above studies place an emphasis on the social, cultural and, to a lesser extent, innate biological dimensions of human interaction, which is governed by rhythm, temporality and shaped by the process of entrainment. While these authors are not specifically describing musical entrainment, their emphasis on cyclical timing patterns, human rhythmical behaviour, and synchronous rhythmic interaction in ensemble situations suggests that these concepts are generally applicable to the study of groove within the Cuban rhythm section. The greatest challenge when making direct connections between socio-cultural concepts of entrainment and musical entrainment lies in the lack of empirical timing data used by these scholars. Although their arguments are intriguing and thought provoking, without such timing data it becomes very difficult to test and therefore prove the validity of these theorisations.

Making more empirically informed arguments, cognitive psychologists Mari Riess Jones and her colleagues have used statistical and mathematical methods to develop theories of the role that entrainment plays when individuals perceive and attend to complex rhythmic structures. Large and Jones' (1999) theory of 'attentional dynamics' postulates that the participating listeners employ a complex of internal oscillations, called *attending rhythms*, that, via the process of entrainment, 'match up' with and may be shaped by the time patterns of external rhythmic events. In addition, Large and Jones suggest that *attending rhythms* are capable of tracking time, reacting to periodic changes in external rhythmic events and adjusting their own phase and period to achieve a desired degree of synchronisation (Large and Jones 1999: 132, 153).

According to Jones, an important aspect of tracking rhythmic events is the ability to shift attentional focus as external rhythm events unfold. Although listeners may initially direct attentional focus towards, and 'lock in' with, the more salient metric features – such as a person's "characteristic articulation rate" during conversation, or in music, the tactus (see chapter 4) – attentional focus can also shift to other event levels (Jones and Boltz 1989: 470). In a musical context, these event levels may extend upward from the pulse, to a measure, to a phrase, to a period, to large order forms (Clayton et al 2005: 26).

Jones and her colleagues have suggested factors that might direct and constrain attentional focus. These factors include the individual's goals, stage of development and level of ability. For example, in interactive conversation, if a listener's goal is to "catch" the global idea of a speaker, attending will be directed towards the higher focal time periods (or levels) of an utterance. By contrast, if a listener's goal is to concentrate on vowel pronunciation or a speaker's dialect they will attend to lower focal periods – Jones and Boltz (1989: 471) refer to these different attentional modes as 'future-oriented' attending and 'analytical attending' respectively. Considerable attentional skill is also needed to

execute these attentional shifts, skills that have to be "implicitly acquired" (Jones and Boltz 1989: 471), internalised as cognitive schemas (Clayton et al 2005: 26) and used proficiently in real-time interaction.

The use of cognitive schemas in interaction helps to account for one way in which an individual internalises a culturally shared sense of time and rhythm. As people attend to and entrain with others, they develop schemas that embody not only knowledge and skills regarding *how* to attend to external rhythmic events, but also culturally prescribed norms and *ways* of interacting. This perspective also helps to explain how two or more individuals might perceive and experience different versions of exactly the same rhythmic event, referred to as 'subjective rhythmization' by some music theorists (Handel 1989: 383-459; London 2004: 14-15). During learning, culturally prescribed rhythms mesh with an individual's endogenous rhythms, resulting in an intersubjectively shared schema of an event's rhythmic pattern, leading people to have "different temporal perspectives on the same event" (Jones and Boltz 1989: 471) and "different entrainment experiences even though they may be participating in the same musical performance" (Clayton et al 2005: 26).

In sum, socio-cultural models of entrainment provide a useful starting point for a general discussion of the role that rhythm and temporality play in interactive behaviour and the formulation of a collective group identity and culturally shared sense of time and rhythm. Studies in cognitive psychology suggest that the entrainment concept is also a useful tool for discovering how, during ensemble interaction, an individual directs and focuses attentional energy to complex rhythmic events and might adjust the timing of these cognitive processes to achieve the desired degree of synchronisation. Furthermore, perspectives from cognitive psychology are useful for framing theorisations of how individuals might develop, via the process of entrainment, intersubjectively shared cognitive schemas of rhythmic events. Following on from discussions of entrainment in

non-musical situations, the next section considers how entrainment might be applied to the study of timing relationships in ensemble music performance, and more specifically to the investigation of groove.

Entrainment, Timing and Groove

Whilst there have been few explicit connections made between entrainment theory and music performance, ethnomusicologists such as Alan Lomax (1982) and John Blacking (1977b, 1983) have used approaches and methods which suggest a relationship between the two domains (Clayton et al 2005: 34). However, it is Charles Keil's theory of Participatory Discrepancies (PDs) that provides the most explicit connection between the development of theories in entrainment and notions of groove.

Keil theorises that active *participation* is a key process in fruitful musical interaction. He draws on the work of French and British participation theorists, Barfield and Lévy-Bruhl, to argue that involvement in a communal or social event leads to a feeling of euphoric "oneness" and that participation deepens social connections and strengthens group identities. He adds that active participation in events through dancing or music making can also have profound effects on human experiences: "participation...promises ever deeper and more satisfying knowledge of who we are" (Keil 1994 [1987]: 98). Whereas *participation* emphasises the social aspects of collective music making, the second theoretical component, *discrepancies*, focuses on the musical timing relationships between participants. For Keil, *discrepancies* are the idiosyncratic, interactive and expressive timing nuances that are behind the creation of the musical groove. It is the slight 'out of syncness' in the groove generated by interacting musicians that invites participation, draws the listener in, evokes a deep sense of identification, or "participatory consciousness", and keeps participants coming back for more (Keil and Feld 1994: 22-23; Keil (1994 [1987]); Keil 1995: 13).

Keil's emphasis on the interactive timing relationships between grooving musicians provides the most obvious point of connection between his theorisations and those of entrainment theorists. For instance, Keil writes of the interactive processes that underlie groove production as the experience of "being together and tuning up to someone else's sense of time" (Keil and Feld 1994: 24). And entrainment scholars have argued that these interactive timing processes could "be understood as the socio-musical process of being entrained at the preferred degree of synchronicity" (Clayton et al 2005: 36).

A number of music scholars have drawn on Keil's theory to investigate the interactive micro-timing discrepancies that lie behind ensemble groove production, with the genre of jazz perhaps receiving the most attention. For example, Prögler (1995) uses ethnographic and empirical methods to measure the degrees of synchrony and timing discrepancy between different musicians in jazz rhythm sections and Doffman (2008) combines PD and entrainment theory with micro-timing data in his psychologically informed exploration of jazz trio grooves. Some other important and relevant timing studies that draw on Keil's theorisations are Gerischer's (2006) micro-rhythmic analysis of Afro-Brazilian percussion grooves, Washburne's (1998) ethnographically framed micro-timing analysis of swing in salsa and Alén's (1995) analysis of timing variations of Cuban *tumba francesa* toques (basic rhythmic cells).

While related, all of the above-mentioned timing studies have a slightly different theoretical and methodological emphasis. Ethnomusicologists such as Prögler and Washburne place more of an emphasis on micro-timing, PD theory and ethnography but make no reference to entrainment theory. Doffman's approach, combining micro-timing data, statistical analysis and ethnography with PD and entrainment theory, is perhaps closest to my own, although his approach draws more on the discipline of psychology. As the focus of the current study is to blend ethnomusicological, psychological and empirical approaches and apply them to the investigation of rhythm section timing relationships and

interactions that characterise Cuban dance grooves, all of these approaches are in some way relevant, as will be become apparent in this and forthcoming chapters.

However, all PD-inspired timing studies, despite theoretical, stylistic and methodological differences, share two broad conclusions. Firstly, they suggest that without timing discrepancies between rhythm events, music would sound dull and lack rhythmic energy and drive (Gerischer 2006: 103; Prögler 1995: 48; Washburne 1998: 174). Secondly, they suggest that groove is the result of timing discrepancies that do not maintain a consistent relationship to one another, rather that they are continuously negotiated and adjusted by ensemble musicians in real time. As Prögler postulates:

> Perhaps with a full ensemble each person's participatory discrepancies will tend towards shifting from ahead to behind, and back to ahead, as the performers constantly re-orient themselves to each other, sliding in and out of phase with each other (Prögler 1995: 43).

These subtle ahead/behind rhythmic negotiations between musicians may also have important emotional, interpersonal and aesthetic dimensions. Jazz rhythm sections speak of negotiating a groove as like being "married" and as an "intimate" experience, and of the close "emotional empathy" players develop with one another (Berliner 1994: 350; Monson 1996: 68). In his discussion of the role of PDs in Kaluli aesthetics, Steven Feld writes, "the essence of 'lift-up-over sounding' is part relations that are in *synchrony while out of phase*". By "in synchrony" Feld is referring to "the overall feeling of togetherness, of consistently cohesive part coordination in sonic motion" and by "out of phase" he is referring to how each of the parts are "continually changing in degree of displacement from a hypothetical unison" (Feld 1994 [1988]: 119).

Critics of the PD-inspired research of Alén (1995), Prögler (1995) and others, highlight a lack of methodological consistency when measuring timing relationships. Kvifte (2004: 58), for instance, focuses on methodological concerns by asking the important question: "Measuring PDs – in relation to what?" In posing this question, Kvifte is making reference to the various different markers that have been used by scholars from which to measure timing relationships. For example, Alén used mathematically derived averages from which to measure timing variance in live ensemble performances and Prögler used a metronome and bass line to measure different sets of PDs in a recording studio environment. In part, the lack of methodological consistency levelled at PD-inspired research stems from the range of different technologies used by scholars to measure timing relationships. As Keil points out, in 1964 when he was developing his theory, measuring devices were limited, and subsequent research has used a range of different technologies to measure PDs (1994 [1966]: 67).

Other critics of PD theory suggest that the precise link between the social (participation) and the musical (discrepancy) dimensions is unclear (Doffman 2008: 30), especially in relation to music that makes use of sampled and sequenced loops in recorded and live performance (Zagorski-Thomas 2007: 328, see also Butterfield 2010: 173). With these types of music – electronic dance music springs to mind – the musical groove is subject to computer quantising and therefore contains no timing discrepancies. So what is the nature of participation in these musical contexts?

While the above criticisms of the work of Keil and others are valid, for me the strength of PD theory lies in the provision of a general theoretical framework within which timing analysis can be conducted across a variety of musical genres and in different performance contexts. Judged by this criterion, PD theory is highly successful and provides thoughtful insights into the ways in which musicians experience groove production and of the socio-musical timing processes that underlie those experiences.

Similarly, although related timing studies may vary greatly in the empirical methods used and therefore lack consistency in approach, they provide crucial insights into the micro-rhythmic interactions and micro-timing relationships that underlie real-time groove production. Furthermore, by thoughtfully combining ethnographic methods, PD theory and micro-timing analysis with findings from related extant studies it is possible to address some of the limitations associated with this type of research, particularly the connections between participation, timing and groove.

Such a combined approach is also useful for uncovering instances of musical entrainment, as it facilitates the precise measurement and interpretation of the micro-timing relationships and rhythmic interplay between rhythm-section musicians as they interact and synchronise to create a successful groove. While future chapters explore different facets of musical entrainment, timing and groove within the rhythm section (i.e. phase relationships and group tempo); the remainder of this chapter focuses on one important aspect of the micro-timing relationships that underpin the creation of a successful groove: the role instruments play within the rhythm section. It is highly probable that timing profiles of rhythm-section players (percussion, bass and piano/tres) are reflective of and are influenced by the different roles that instruments occupy. For example, the timing profile of an instrument like the *clave*, which fulfils a timekeeping role in Cuban dance music (see chapter 4), might show less variability in timing relative to the piano, for example, which typically plays a more improvisatory role. Furthermore, it is likely that different levels of temporal variance have some influence on synchronous collective groove production within the rhythm section. To explore this proposition further and to provide the reader with a context in which to situate the forthcoming timing analyses, the discussion now turns to the roles typically occupied by different rhythm section instruments in Cuban and Cuban-related styles.

Roles within the Rhythm Section

In many Cuban and related African-American musical styles, the 'timekeeper' versus 'improviser' model is prevalent. In jazz rhythm sections, for example, the bass player's walking line (coupled with the drummer's ride cymbal) typically plays a central time-keeping role, providing the foundation of the groove on which everything is built. As jazz bassists Cecil McBee and Jerome Harris have commented: "the bass player is the captain", "*everyone* in the band is affected if the bass player isn't on the case" (quoted in Monson 1996: 50-51. See also Ashley 2002: 312). Instruments that play a more improvisatory role within the jazz rhythm section (e.g. piano, guitar or vibes), are often described as playing more "freely" and as adding an additional rhythmic layer that sits on top of the timekeeping instruments. Monson argues that, "in essence, the pianist is expected to improvise an appropriate rhythmic and harmonic counterpoint to the melody or solo. The comp adds a rhythmic layer to the texture provided by the walking bass and the drums" (Monson 1996: 44).

Further examples of the use of the 'timekeeper' versus 'improviser' model are also found in many African and Afro-Cuban musical ensembles. For instance, within certain West African ensembles Nketia writes of rhythm sections being structured according to the well-established principle of "grading". The "grading" principle, argues Nketia (1975: 133), categorises instruments as "accompanying" (those that reinforce the timeline and/or tactus and play with minimal variation), and "responsive, or lead instruments" (those that are assigned a more expressive role), categorisations based on the density and complexity of instrumental parts. And in Afro-Cuban *rumba*, the three-drum configuration (*tumbador, salidor* and *quinto*) is based on the role each instrument plays and the register in which patterns are played. The lower-pitched *tumbador* and *salidor* play more steady repeated rhythmic patterns that anchor rhythm section activities, whilst the high-pitched *quinto* improvises and converses with the other drums and dancers (Daniel 1995). In addition, within *rumba* ensembles other percussion instruments such as the *clave* perform a more

strict timekeeping function, setting the tempo, mood and providing a structural basis for improvisations.

Interestingly, from a groove perspective, the characteristic 'timekeeper' versus 'improviser' model may contribute to the drive, intensity and energy of Cuban dance music such as *rumba*, as Daniel argues: "each drum creates a tension or pull in the rhythmic feeling with respect to the other drum parts" (Daniel 1995: 81). Making a more explicit connection between this performance dynamic and notions of groove, Monson puts forward a similar argument in jazz contexts: "the quality of swinging or grooving is itself produced by this dynamic tension between the relatively fixed and variable elements of the ensemble" (Monson 1996: 83).

In the context of *son* and salsa styles, the timekeeper or accompanying roles (depending on the style and instrumental line up) are typically played by various percussion instruments: principally the *clave* and bells but also *maracas*, *güiro*, *cáscara* and *tumbadora* (*congas).* Rhythm section instruments that play a more improvisatory or responsive role include *bongó*, *timbales*, bass and piano/*tres*. It should be pointed out that when describing instruments like the piano as playing an improvisatory role, there is a difference in approach to the parallel role played by the piano in a jazz context. As ethnomusicologist Peter Manuel points out, unlike jazz "comping", which consists of "irregular, loose accentuation", in Cuban music the piano is still required to provide "steady rhythmic/chordal figures" (Manuel 1988: 35) that are locked into the rhythm section. Elsewhere, in a more detailed discussion of improvisation in Latin dance music, Manuel uses the term "accompanimental improvisation" to highlight the dual role improvisatory instrumentalists must play, as they strive to strike a balance between repetition and variation, stability and flexibility, and the aesthetic expressions of the individual and the collective (Manuel 1998: 133-136).

Given the importance of the 'steady timekeeper' versus 'improvisator' model in Cuban and Cuban-related styles, I was interested in discovering what micro-timing performance data might reveal about these musical roles as they are played out in real time and what influence they might have on groove production in the rhythm section. The following section details the musical materials and methods used to conduct this micro-timing analysis.

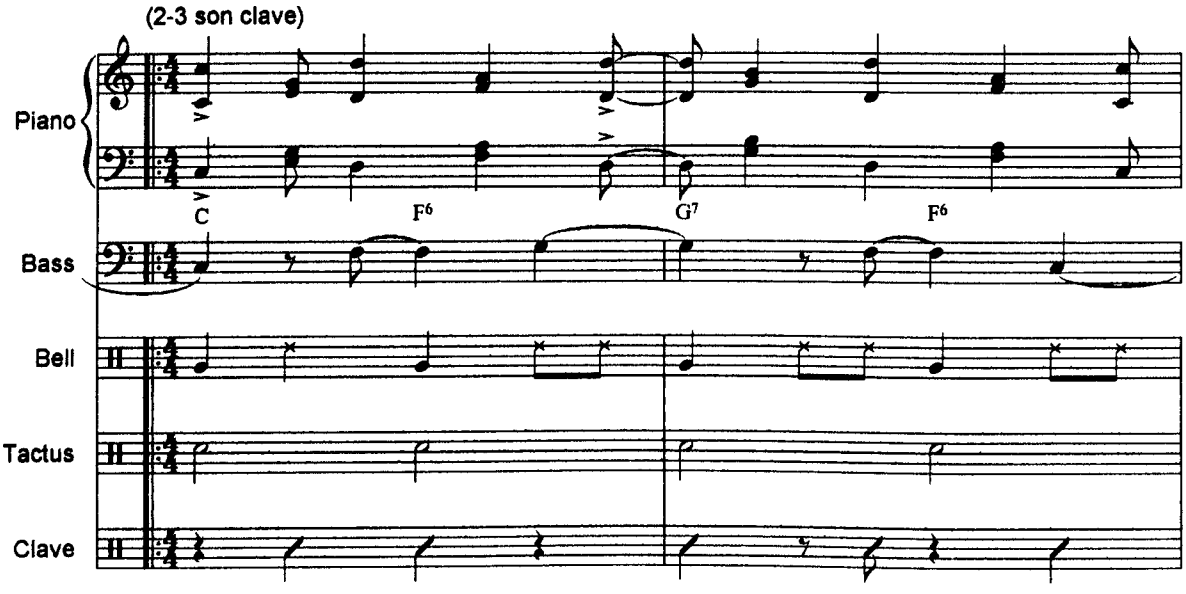
Musical Material and Methods

Three performance excerpts (each by different ensembles) were selected for analysis. All excerpts were taken from the *montuno* section. This was an important consideration because at the *montuno* the *bongosero* typically switches to the bell to increase the dynamic and to anchor the rhythm section during lead instrument (e.g. trumpet, sax) and vocal solos. Furthermore, at the *montuno* other rhythm section instrumentalists switch to playing standard *tumbaos* (or variations thereof) and place more of an emphasis on the groove compared to the preceding *son* section (see chapter 8 for more detail on *son* and *montuno* transition). Another important consideration when selecting excerpts for use in this and subsequent analysis was that they were broadly comparable in terms of style (*son* and *salsa*), tempo, harmonic sequences used and *tumbaos* played (see chapter 2 for more detail of excerpt selection and musical materials used).

I analysed the micro-timing performance data of three instruments within the rhythm section: bell, bass and piano/guitar. This decision was partly influenced by practical considerations: as detailed above, Cuban rhythm sections typically consist of at least six parts (e.g. bass, piano/*tres*, bell, *maracas*, *clave*, *bongo*) and analysing all of them was not possible due to time constraints. There was, however, a more musical consideration: the role these instruments play within the rhythm section. The bell – known variously in Cuban dance music as the *cencerro* (cowbell), *campana*, or bongo bell – fulfils the role of principal timekeeper, providing the steady "pocket pulse" (Washburne 1998: 179) for the

montuno groove (other timekeeper instruments such as the *clave* and *maracas* were not played continuously throughout the excerpts analysed).

Figure 6.1 – Standard Bell, Bass and Piano Tumbaos used in the Montuno Section of Son and Salsa



(Adapted from Mauleón 1999: 40)

A notable feature of the timekeeping bell pattern shown in figure 6.1 is its relationship to the tactus or primary pulse. The lower pitch strokes of the bell pattern are played on the mouth of the bell (notated as the lower pitched quarter notes in figure 6.1) to provide a strong, open and audible tone that cuts through the dense polyrhythmic texture of the ensemble to stridently mark the tactus on beat one and three. The higher pitched bell strokes (notated as crosses in figure 6.1) are played on the edge of the bell with a muted tone, filling in around the main tactus defining strokes. By marking the tactus with strong open tones, the bell is playing an important dual role: acting as both timekeeper and reinforcing the 'half-note-pulse *clave*' model that is of considerable significance to the groove of Cuban dance music (see chapters 4 and 5). The bass and piano/guitar, by contrast, typically show more pattern variation and play 'freer', with a more lyrical take on the standard *tumbaos* (figure 6.1), consistent with more improvisatory roles.

As can be seen in figure 6.1, the bass and piano patterns rarely fall on the tactus beats played by the bell. Therefore, the precise musical materials taken from each pattern for temporal comparison varied for three instruments. For the bell pattern, the tactus-defining beats one and three were used. For the bass pattern, which typically plays on the fourth and seventh eighth notes, the fourth eighth note in each bar was used and then divided by two to give two strokes of equal time length in each bar, and for the piano/guitar pattern, eighth notes four and eight in each bar were used. Consequently, the musical materials used for comparison did not fall in exactly the same place within the bar. As this material was not used for phase analysis – which requires the comparison of musical events that fall at the same time point (see chapter 7) – this method did not adversely affect the accuracy of the analysis presented in this chapter. However, this method had the advantage of extracting a consistent half-note pulse for each instrument that facilitated a more precise temporal comparison.

Where the instrumentalist varied the pattern and improvised around the standard *tumbao*, the onsets were calculated from the nearest surrounding ones. For example, if the pianist did not play on the last eighth note in each bar, but instead played on the seventh eighth note and the first beat of the next bar, this onset was calculated by halving the time distance between the two neighbouring onsets. Staying true to their relative performance roles onset calculations were never needed for the bell as the same pattern was played throughout with little variation, rarely needed for the bass, but were more frequently needed for the piano/guitar parts. On average, for a single 1 minute excerpt, around 6 of 110 onsets were calculated for the piano/guitar.

Once the half-note timing data was extracted from each pattern, the instantaneous tempo (i.e. the momentary levels of variation in tempo) for each instrument was calculated from the inter-onset intervals (IOIs). An IOI is the time distance from the attack point of one musical event to the attack point of the next musical event in the same part (Clarke 2004:

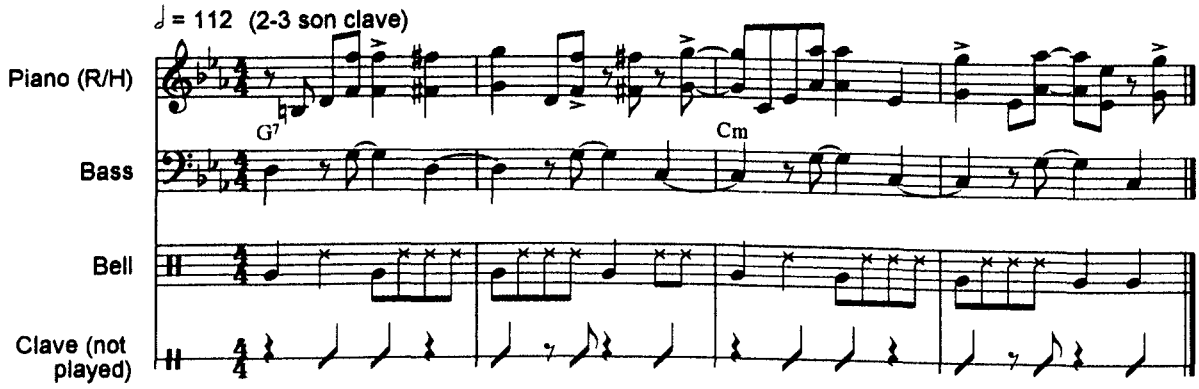
80; London 2004: 4). The IOIs were converted into bpm by using the formula: 60 divided by the IOI. Although other micro-timing studies (e.g. Butterfield 2010; Doffman 2008) have used the raw IOIs as a measure of instantaneous tempo, in the context of the current study converting them into bpm was advantageous for two reasons. Firstly, when using graphs to compare micro-timing data, IOIs present a less obvious profile of a musician's performance than bpm by displaying rather unruly zigzag patterns that are more difficult to follow. Secondly, although IOIs and the equivalent conversion to bpm profile the same information, discussions of tempo in bpm allows for a more familiar and musical presentation of micro-timing data (for a fuller discussion of this issue see Clarke 2004: 81-84).

Instantaneous Tempo Profiles: Bell, Bass and Piano

Excerpt One: Riamba, 'El Cuarto de Tula'

The first excerpt (1 minute and 6 seconds in length) was taken from the *montuno* section of the Cuban tune 'El Cuarto de Tula' as performed by London based group Riamba. The four-bar transcription shown in Figure 6.2 presents a sample of the bell, bass and piano parts that were most typically played by the musicians throughout the excerpt (full transcriptions of all excerpts used for analysis in this chapter and the following chapters are given in appendix C).

Figure 6.2 – Sample Bell, Bass and Piano Parts for Riamba Excerpt (bars 5 to 8)



This transcription reveals that Riamba musicians are playing variations of the standard patterns shown in figure 6.1. The bell is marking the tactus by playing open tones on the mouth of the bell on beats one and three, the bass is playing the standard anticipated *tumbao*, and the piano is playing a version of the standard *tumbao*, with slightly less syncopation and more arpeggiation, as can be seen on bar three. The *clave* is shown in figure 6.2 for reference purposes but was not played throughout the excerpt.

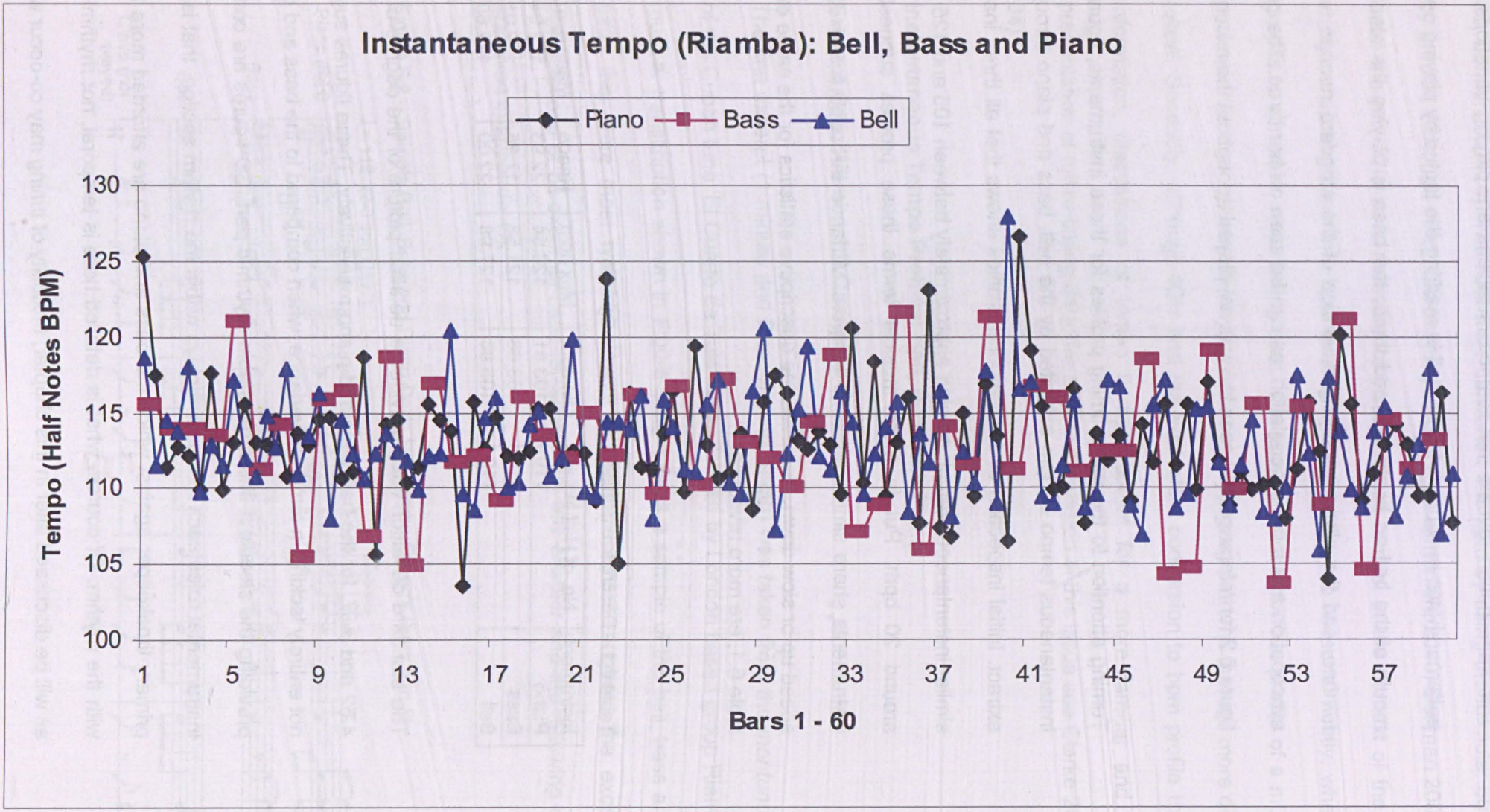
Turning attention to the micro-timing profiles for these instruments, figure 6.3 shows the instantaneous tempo in bpm exhibited by the bell, bass and piano throughout the entire extract. Initial inspection of the temporal profiles shows that all three instruments exhibit similar instantaneous tempi: ranging approximately between 105 and 125 bpm, a range of around 20 bpm. Put in more musical terms these profiles suggest that all three instruments share similar levels of temporal variance throughout and do not drastically speed up or slow down. However, the descriptive statistics for the same excerpt, shown in table 6.1, are more revealing.

Table 6.1 – Descriptive Statistics for Riamba Excerpt

Instrument	No. of Half Notes	Min bpm	Max bpm	Range	Mean bpm	Std. Deviation
Piano	119	103.61	126.54	22.93	112.94	3.97
Bass	118	103.68	121.53	17.85	112.91	4.52
Bell	119	105.96	127.96	22.00	112.89	3.60

The standard deviation (SD) provides a detailed picture of the degree of variance: 3.60, 4.52 and 3.97, for the bell, bass and piano respectively. These figures suggest that, while not entirely lacking in temporal variance, when compared to the bass and piano, the bell is providing the steadiest and most stable rhythmic part. SD figures are consistent with the instrumental roles each instrument plays within the rhythm section, that is, the bell as the primary timekeeper against which the bass and piano are afforded more freedom to play with the rhythm. Of course, what is detailed here is temporal, not rhythmic, variance but, as will be discussed later in this chapter, flexibility of timing may co-occur with variability of

Figure 6.3 – Instantaneous Tempo (Riamba): Bell, Bass and Piano from the Montuno Section of El Cuarto de Tula (1m 6s, 60 bars)

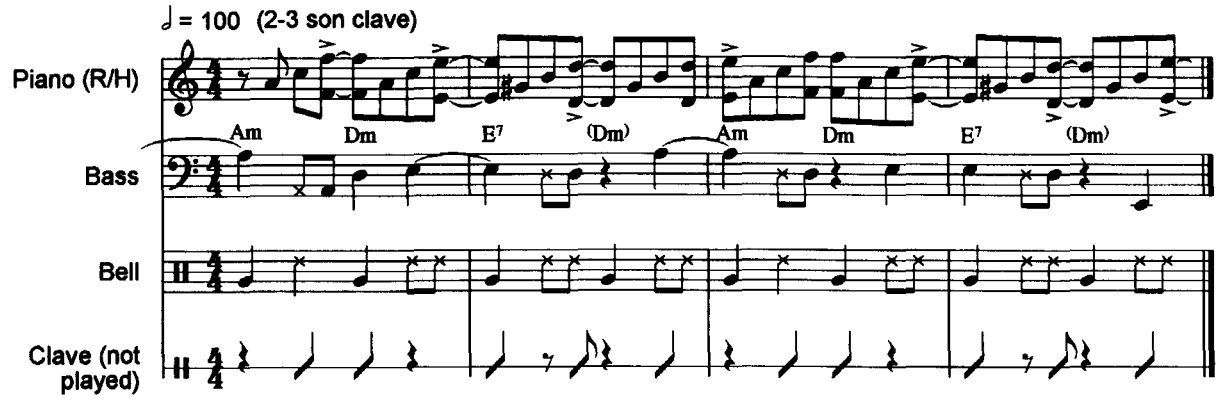


rhythmic patterns. Perhaps then, as the roles played by the bass and piano allows them greater freedom to explore rhythmic variations of the standard *tumbaos,* they may also be afforded greater temporal freedom when executing these expressive rhythmic variations.

Excerpt Two: Havana Club Descarga, Muñeca

The second of the three excerpts was taken from the *montuno* section of the *salsa* tune 'Muñeca' as performed by Havana Club Descarga in London. The excerpt is 1 minute and 4 seconds in length and, as with the Riamba excerpt, the instrumentalists are playing versions of the standard bell, bass and piano *tumbaos.* Figure 6.4 shows a sample transcription of the patterns played.

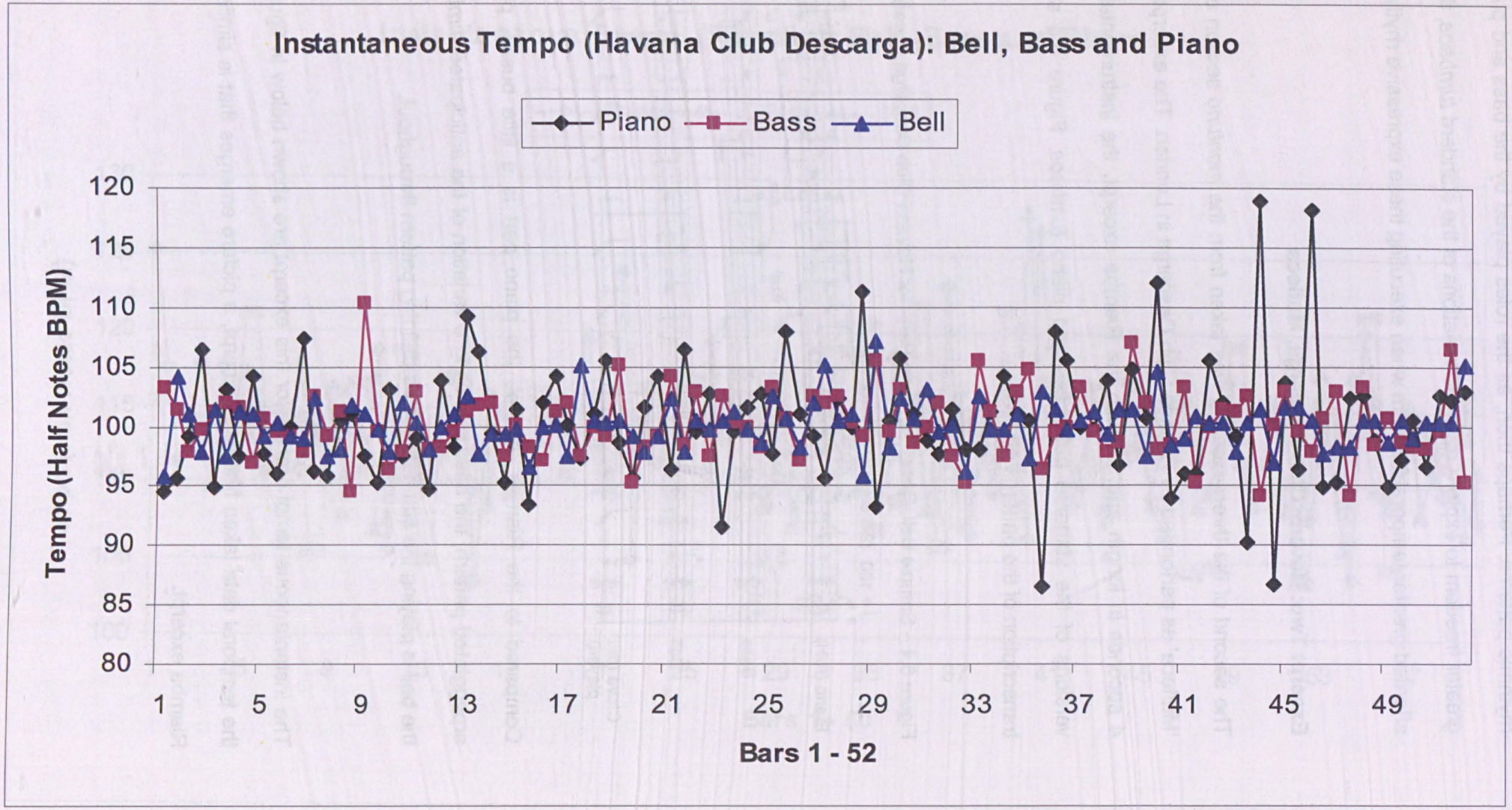
Figure 6.4 – Sample Bell, Bass and Piano Parts for Havana Club Descarga Excerpt (bars 13 to 16)



Compared to the Riamba excerpt, the piano part is a little busier, playing a highly arpeggiated pattern, the bass is playing a variation of the anticipated *tumbao* pattern and the bell is playing the standard tactus-defining pattern throughout.

The instantaneous tempi profiles for this excerpt are shown below in figure 6.5. Viewing the temporal data taken from this excerpt, a picture emerges that is similar to that of the Riamba excerpt.

Figure 6.5 – Instantaneous Tempo (Havana Club Descarga): Bell, Bass and Piano from the Montuno section of Muñeca (1m 4s, 52 bars)



The range of instantaneous tempo is approximately between 90 and 110 bpm, similar to the range in the Riamba excerpt of around 20 bpm. However, unlike in the Riamba excerpt, in the Havana Club Descarga excerpt the piano shows greater temporal range than the bell and bass. This suggests that, within this group, the bell and bass have a tighter temporal relationship, which provides a more stable rhythmic platform over which the piano is at liberty 'to play' with the instantaneous tempo. Perhaps this is due to the fact that the piano part is busier, thereby increasing the instrumentalist's cognitive load or it may be indicative of the pianist's individual playing style.

Table 6.2 – Descriptive Statistics for Havana Club Descarga Excerpt

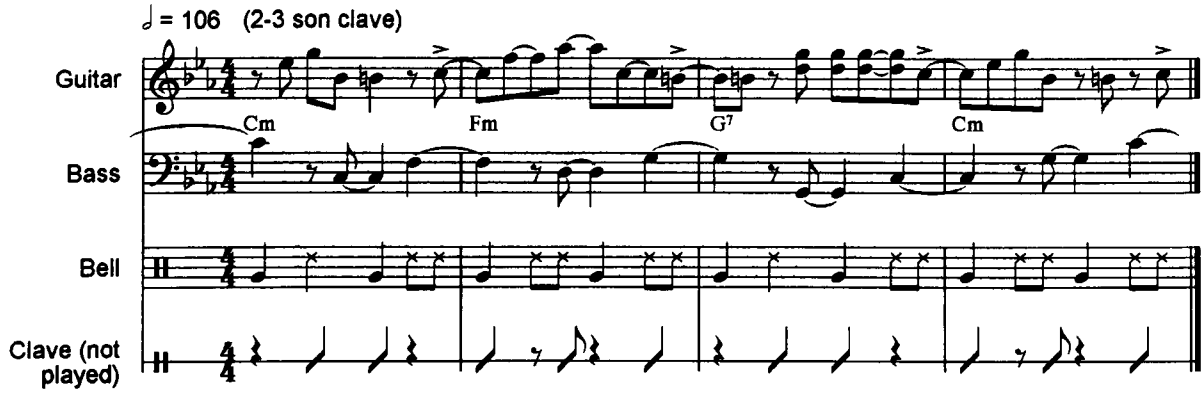
Instrument	No. of Half Notes	Min bpm	Max bpm	Range	Mean bpm	Std. Deviation
Piano	103	86.49	118.90	32.41	100.23	5.23
Bass	103	94.07	110.39	16.32	100.15	2.88
Bell	103	95.82	107.21	11.39	100.13	2.06

The descriptive statistics, shown in table 6.2, provide a more detailed picture of variance in instantaneous tempo. The range for the bell and bass is around half that of the piano, 11.39 and 16.32 bpm respectively, and the SD for the bell and bass is also around half that of the piano. Interestingly, despite the piano having greater variance in instantaneous tempo than the bell and piano, the mean bpm for the three instruments is very close at around 100.15 bpm. In terms of instrumental roles within the rhythm section, these statistics are typical of what one might expect: the bell adheres to its role as timekeeper, providing the more temporally stable pattern compared to the bass and piano.

Excerpt Three: Asere, Habanera

The third excerpt, lasting 1 minute and 6 seconds, was taken from the *montuno* section of 'Habanera' as performed by Cuban *son* group Asere. As is typical with the instrumental format found in many *son* groups, piano is not used. Instead, the guitar or *tres* often plays this role.

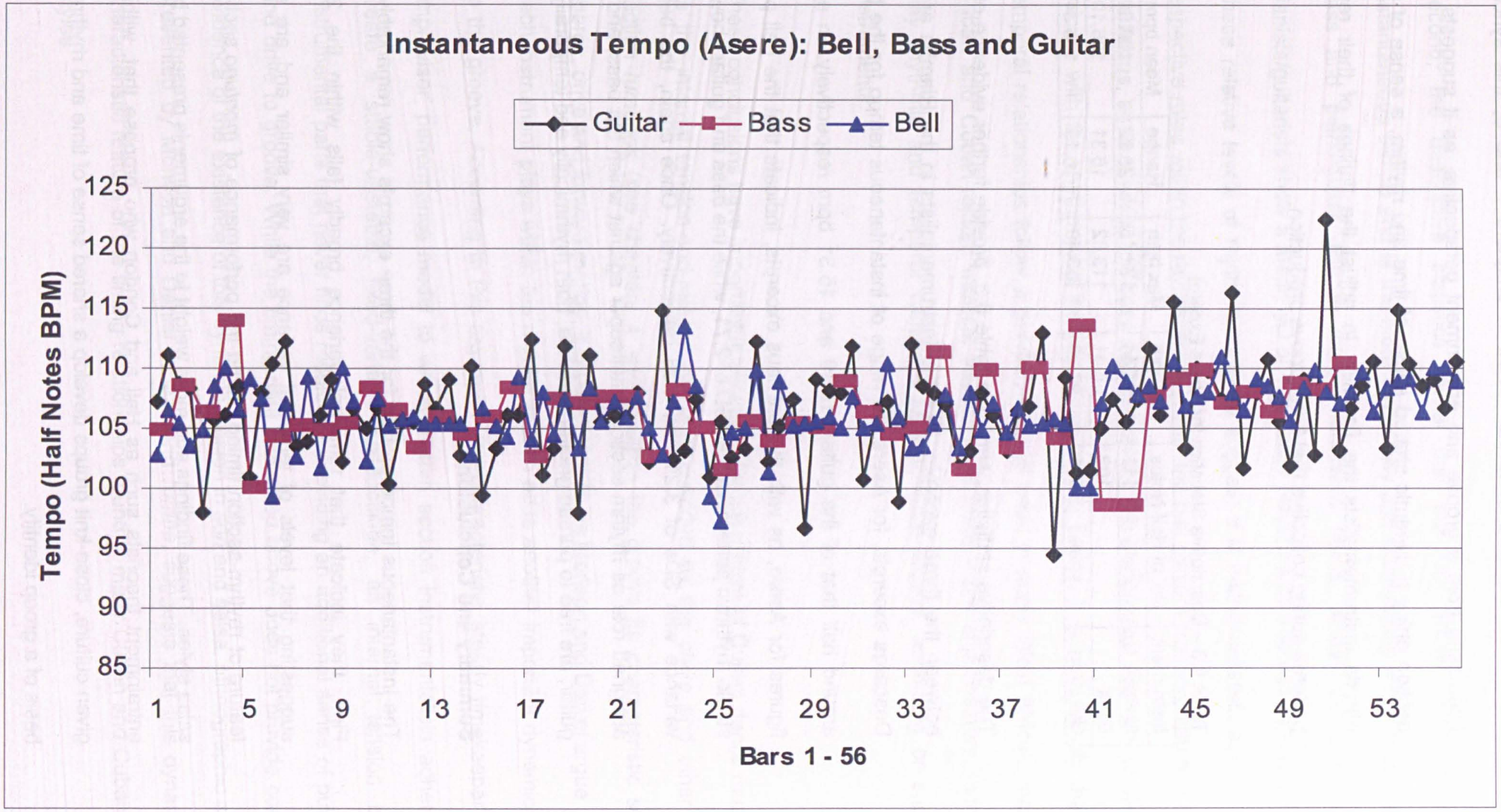
Figure 6.6 – Sample Bell, Bass and Guitar Parts for Asere Excerpt (bars 13 to 16)



As the sample transcription in figure 6.6 shows, within the Asere group, the guitar plays the typical syncopated *tumbao* comparable to that played by the piano in salsa groups. Once again, the bass plays the anticipated *tumbao* pattern and the bell plays the standard pattern throughout with little variation.

The temporal data for the Asere (figure 6.7) shows a remarkably similar trend to that of the Riamba and Havana Club Descarga excerpts: the range of instantaneous tempo for the three instruments is approximately between 95 and 115 bpm, giving a temporal range of around 20 bpm. However, unlike the previous excerpts Asere instrumentalists appear to have a synchronous temporal relationship, speeding up and slowing down together. This is particularly evident in the last quarter of the excerpt, where the bell, bass and guitar share a slight increase in instantaneous tempo from around bar 41 onwards. Perhaps this increase in tempo corresponds to the change of dynamic that occurs at this point during the performance. In this segment of the performance, two rhythm section instruments drop out (congas and rhythm guitar), the bass plays a funkier version of the anticipated *tumbao* and the bell plays more high-pitched strokes that fill in around the primary tactus strokes on beats one and three (see full transcription in appendix C). This tempo increase is very slight and may be the result of variability of rhythmic patterns, a change of dynamics or a combination of the two, but it is a clear indication that the bell, bass and guitar are shifting tempo together as a synchronous unit.

Figure 6.7 – Instantaneous Tempo (Asere): Bell, Bass and Guitar from the Montuno Section of Habanera (1m 6s, 56 bars)



As will be explored in further detail in chapters 7 and 8, this synchronous shift is interesting from a groove and entrainment perspective, as it suggests that the rhythm section enjoy a dynamic shared sense of time and rhythm, a sense of sharedness that affords instrumentalists the flexibility to adjust the timings of their respective rhythm patterns during collective real-time groove production.

Table 6.3 – Descriptive Statistics for Asere Excerpt

Instrument	No. of Half Notes	Min bpm	Max bpm	Range	Mean bpm	Std. Deviation
Guitar	111	94.44	122.45	28.02	106.51	4.36
Bass	102	98.51	113.82	15.31	106.19	3.21
Bell	111	97.30	113.49	16.19	106.34	2.71

The descriptive statistics, shown in table 6.3, provide further evidence of the similarities between the three excerpts. Like the instrumentalists in the Riamba and Havana Club Descarga excerpts, for Asere the range of instantaneous tempo for the bell and bass is around half that of the guitar, 16.19 and 15.31 bpm respectively. In addition, the SD figures for Asere, as with the previous excerpts, indicate that the bell provides a more stable rhythmic pattern, with an SD of 2.71, while the bass and guitar show more temporal variance with SDs of 3.21 and 4.36 respectively. Once again, the bell is fulfilling its assigned role as rhythm section timekeeper against which the bass, and particularly the guitar, are free to pursue greater variance, both rhythmically and temporally.

Summary and Conclusions

The instantaneous tempo profiles for the three excerpts show remarkably similar trends. First, they indicate that temporal variance broadly falls within the 20 bpm range, suggesting that levels of temporal variance are very similar and are a characteristic feature of rhythm-section timing during the performance of *montuno* sections of *son* and salsa styles. These findings add more weight to the arguments presented by socio-cultural entrainment theorists such as Hall and Condon who propose that, within context of a given culture, close-knit groups develop a shared sense of time and rhythm that forms the basis of a group identity.

Second, the descriptive statistics reveal that the bell shows least variance of instantaneous tempo and is therefore temporally and rhythmically more stable than the bass and piano/guitar. Put in more quantitative terms, across the three extracts pianists/guitarists show a mean SD of 4.52, bass players 3.54 and bell players 2.79 bpm. These relative levels of rhythmic variance suggest that instrumentalists adhere to their respective roles within the rhythm section, with the bell players keeping time and marking the tactus, against which the bass and particularly the piano/guitar are freer to play more lyrically with the rhythm and instantaneous tempo. Lastly, it is highly likely that these temporal relationships follow a pervasive model seen in many West African, jazz, Afro-Cuban and Cuban-related musical traditions, whereby more improvisatory instruments play rhythmic and temporal variations against more steady, anchoring or supporting instruments.

These conclusions have important implications for the groove of Cuban dance music. Just as the internal tension-and-release dynamic provided by the *clave* and other rhythm section *tumbaos* (see chapters 4 and 5) lends the groove its characteristic sense of energy, drive and forward motion, it is possible that, as Monson and Daniel argue, the role each instrument plays within the rhythm section adds another important dynamic tension to the groove. According to this argument, the characteristic 'steady timekeeper' versus 'improviser' performance model to which rhythm section instrumentalists adhere helps create a stable-unstable, fixed-variable juxtaposition, an internal tension between instrumental parts that never finds resolution, providing an additional sense of pull, swing and drive to groove. While the timing data presented above does not provide conclusive evidence of the existence of this dynamic tension in *son* and salsa, ethnographic evidence presented by Monson and Daniel in jazz and *rumba*, suggests that this dynamic is a characteristic feature of the timing relationships found in many Cuban and Cuban-related styles.

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Chapter 7

Rhythm Section Phase Relationships

Following on from the discussion in the previous chapter of how groove is shaped by the respective roles each instrument plays within the rhythm section; the forthcoming discussion explores another important dimension that may also contribute to groove: phase relationships within the rhythm section.

The principle aim of this chapter is, therefore, to draw on micro-timing data to present measures of relative phase between rhythm section instrumentalists – i.e. the alignment between one individual's rhythmic events and the corresponding rhythmic events of another individual – as they are enacted in real time. Quantitative measurements of phase will be married with qualitative data taken from interviews with the performing musicians in an attempt to build up a detailed picture of relative phase and to discover the influence it might have on groove. In order to do this, the discussion takes two perspectives: first, analyses of phase relationships between the bell, bass and piano/guitar across three short excerpts are presented; and second, relative phase at one specific time point within the cyclical rhythmic-harmonic framework (the *bombo*) is analysed and discussed.

Relative Phase: Playing Ahead, On or Behind the Beat

Relative phase is of central importance to many of the theories outlined at the beginning of the previous chapter. For instance, measurements of phase relationships between musicians have been proven to be an effective tool for uncovering instances of musical entrainment (Clayton et al 2005; Clayton 2007) and musicians playing "in synchrony while out of phase" is a key component of Keil's theory of participatory discrepancies and groove.

Typically, musicians refer to these subtle real-time adjustments in phase alignment as playing ahead, on, or behind the beat (Berliner 1994; Doffman 2008; Iyer 2002; Monson 1996; Prögler 1995: 43; Redtenbacher 2011; Washburne 1998 and many others). These subtle timing negotiations between rhythm section instrumentalists have important implications for groove. My anecdotal experiences are that continuously playing ahead of the beat creates a sense of urgency in the groove that pushes the music along, continuously playing on the beat gives a steady, solid, anchoring sensation and continuously playing behind the beat gives the impression that the music is being pulled back, which creates a more laidback, relaxed rhythmic feel. Jazz bassist Rufus Reid reports similar sensations when playing swing grooves: "there's an edge I feel when I'm playing walking bass lines on top of the beat [ahead of the beat]. It's like if you are walking into the wind" (Berliner 1994: 351).

This relationship between the sensations associated with phase alignment and notions of groove is prevalent in Afro-Cuban and Cuban-related dance contexts as well as jazz. In Afro-Cuban *santería* performance, for instance, Hagedorn (2001) highlights the important relationship between *batá* drum micro-timing, notions of swing and the requisite spiritual power and drive needed to bring down the *santo* or *orisha*:

> In an ideal universe, every *batalero* at every ceremony will be able to make his rhythms swing. It is this swing, this extra microvariation in interpretation, that propels the sound forward, and that excites a physical reaction from listeners. Playing *batá* rhythms "straight" will still sound good; it just won't move the room. And if you don't move the room, you won't bring down the *santo*" (Hagedorn 2001: 131).

In his study of groove in salsa, Washburne (1998) makes a similar argument, proposing that, like Hagedorn, there is a deep-rooted connection between micro-timing and relative

phase, and the aesthetic, emotional and propulsive qualities of groove in salsa performance:

> The personal choices musicians make concerning feel are based on both intellectual and emotional considerations. For example, when a conscious decision is made to play either ahead or behind the beat intellectual processes are at work. The motivation behind that choice is often rooted in a musician's emotional perception of the music, such as, a desire to build excitement or tension with the groove. When a band is swinging particularly well the most obvious indications are the heightened emotional responses of the participants, such as smiling, accentuated body movements, and/or occasional shouting (Washburne 1998: 161).

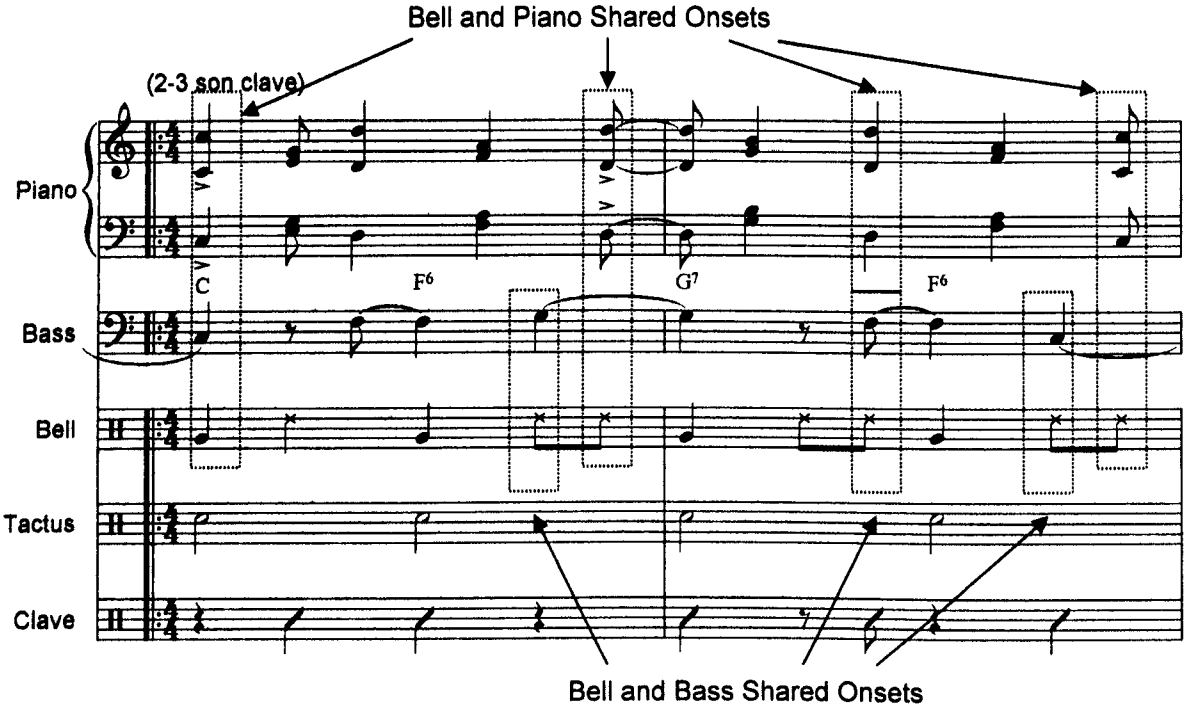
Given the importance of the apparent relationship between relative phase and the emotional, propulsive and participatory qualities of groove, I was interested to discover what micro-timing data might reveal about this relationship in *son* and salsa performance. The following discussion therefore makes use of micro-timing analysis and ethnographic data in order to shed further light on the arguments made by scholars and musicians alike.

Musical Material and Methods

In order to build upon and draw comparisons with the findings in the preceding chapter, the same musical material and instruments will be used for phase analysis as were previously used for the analysis of instantaneous tempo: that is, three 1-minute excerpts taken from the *montuno* section of three different group performances (Riamba, Havana Club Descarga and Asere).

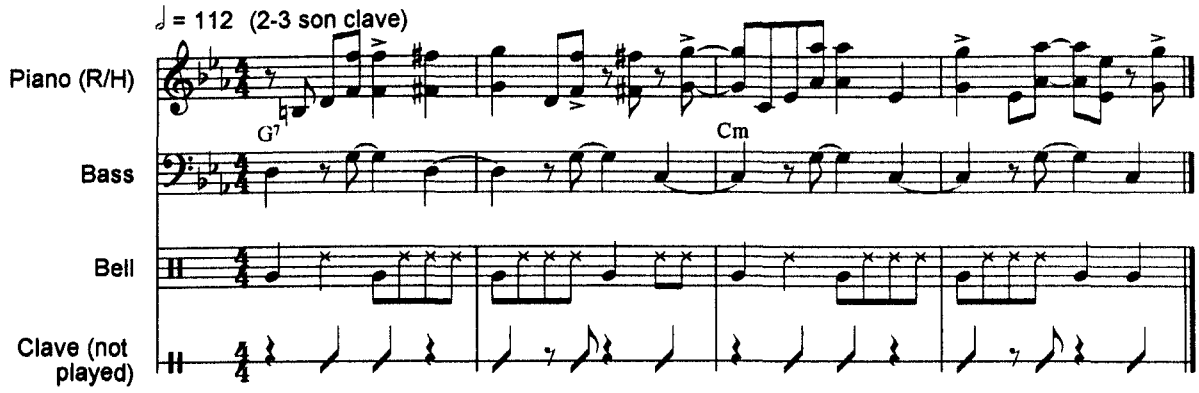
The method used to calculate relative phase was to first identify the shared onsets between pairs of instruments: bell and bass, then bell and piano. Typically, the bell and bass shared onsets on the fourth quarter note on the two-side of the *clave* and the fourth eighth note and fourth quarter note on the three-side. The bell and piano typically shared onsets on the first and last eighth notes on the two-side and the fourth and last eighth notes of the three-side. These shared onsets between instrument pairs are summarised below in figure 7.1.

Figure 7.1 – Shared Onsets in Standard Tumbaos: Bell and Bass, Bell and Piano



However, when instrumentalists varied the standard *tumbao*, an alternative shared onset was used to calculate relative phase. Alternative onsets were most frequently used in piano parts. For example, as can be seen in the sample transcription shown below in figure 7.2, Riamba's pianist does not play on the last eighth note on the two-side: instead he plays on the last quarter note on the two-side. In this case, the last quarter note was used as a shared onset between the bell and piano.

Figure 7.2 – Sample Bell, Bass and Piano Parts for Riamba Excerpt (bars 5 to 8)



In order to present different perspectives on phase timing data and to draw comparisons with extant studies, the raw timing data representing the shared onsets between instrumental pairs is expressed in three ways in the following discussions. Firstly, relative phase is expressed as circular statistics, where 0 degrees indicates exact phase alignment and 180 degrees indicates anti-phase alignment, a method used in contemporary entrainment studies[16]. Secondly, relative phase is expressed in milliseconds, which is perhaps more typical in micro-timing studies (e.g. Prögler 1995). Thirdly, relative phase is expressed as a percentage, representing the proportion by which an instrumentalist plays ahead or behind the bell across the entire excerpt (see Doffman 2008; Prögler 1995, for example).

Presenting multiple perspectives on the same timing data has the advantage of addressing limitations of any one approach used. For example, as the shared onsets chosen result in inter-onset intervals (IOIs) of varying lengths, this has the potential limitation of adversely affecting circular statistical calculations and graphing – perhaps 'skewing' the results. As can be seen in figure 7.1, the IOI between the first onset shared by the bell and piano and the second is eight eighth notes, whereas the IOI between the second and third is five eighth notes. Therefore, expressing the same data in milliseconds

[16] Phase alignment between two series, B relative to A, was calculated by using the formula (B1-A1)/(A2-A1)x360. See Clayton et al (2005) and Clayton (2007) for a more detailed discussion of this method.

and as percentages, which were not derived from circular statistics, allowed me to compare different perspectives on the same data and check for data consistency in the results of all three methods. All of these perspectives are presented below in the form of graphs and accompanying descriptive statistics.

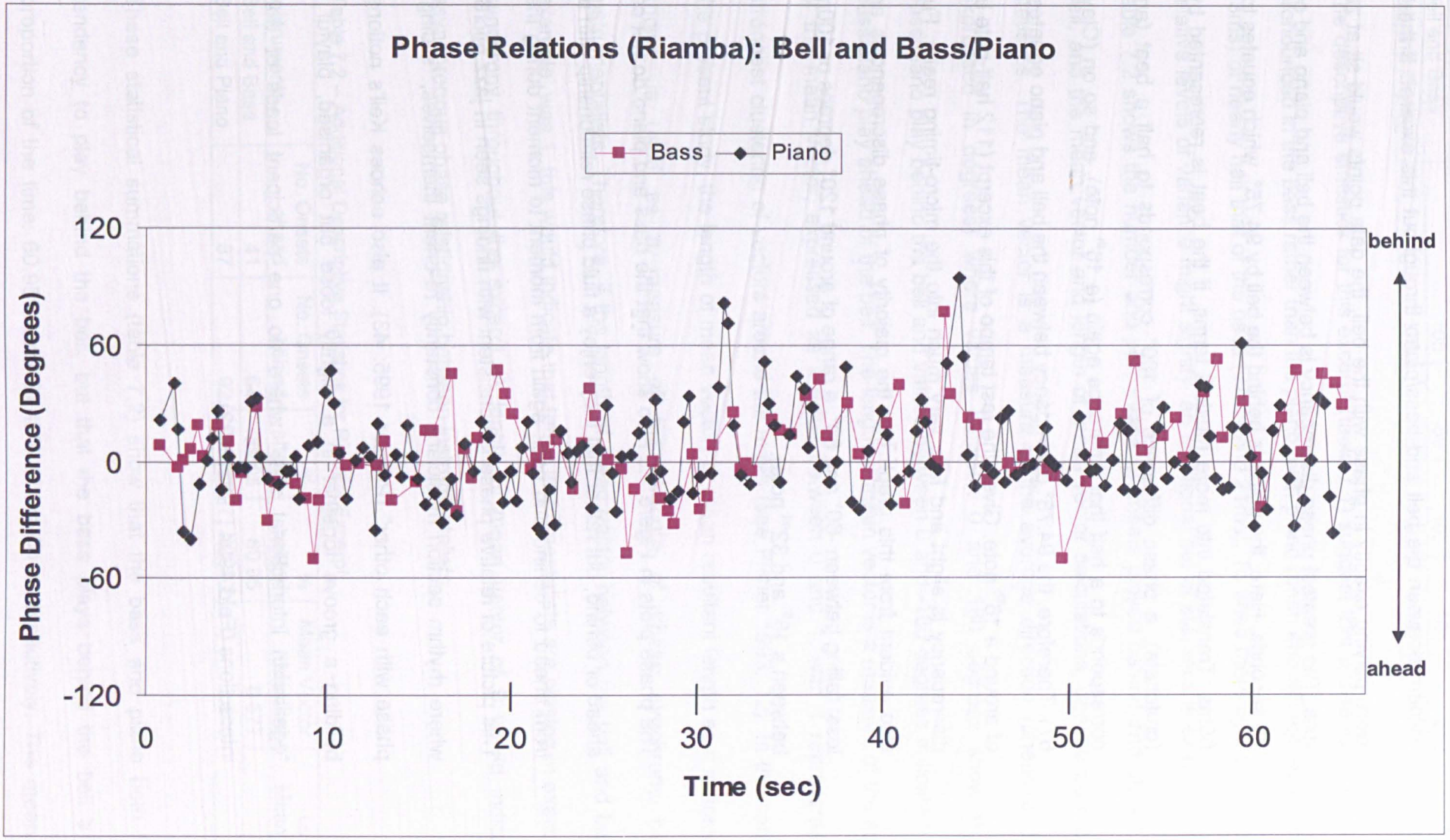
Phase Relationships: Bell, Bass and Piano/Guitar

Excerpt One: Riamba, 'El Cuarto de Tula'

The first excerpt (1 minute and 6 seconds in length) was taken from the *montuno* section of the Cuban tune 'El Cuarto de Tula' as performed by London based group Riamba. See chapter 2 for more details on excerpt selection and performances.

Figure 7.3 shows the phase relationships, represented in circular statistics, for the bass and piano measured against the bell. The bell is represented by the zero, x-axis running through the middle of the graph, and the y-axis represents the phase difference of bass and piano in relation to the bell. As indicated by the vertical ahead/behind arrow to right of the graph, if the data points are positive and appear above the x-axis that instrument is playing behind the bell, and if the data points are negative and appear below the x-axis that instrument is playing ahead of the bell. With this approach, the bell is effectively used as a reference point by which the timing discrepancies of the bass and piano are measured. The bell is used as the primary referent because, as established in the previous chapter, it fulfils a time-keeping role. Therefore, one might expect the bell to provide steady pulse-marking reference points around which the other instruments push and pull as they adjust phase alignment. In order to make the distribution of data around the referent instrument on the x-axis as clear as possible, the y-axis shown in figure 7.3 shows relative phase plots expressed as circular statistics ranging between -180 to 180 degrees.

Figure 7.3 – Phase Relationships (Riamba): Bell, Bass and Piano from the Montuno Section of El Cuarto de Tula (1m 6s)



It is clear from the timing plots in figure 7.3 that discrepancies in phase alignment are evident between the bell and bass/piano throughout this excerpt. If the bass and piano were playing exactly in phase with the bell, the data points would sit at zero along the x-axis. The greatest phase discrepancy is between the bell and piano and occurs at around 44 seconds. Here, the piano is behind the bell by 94.75°, which equates to a difference of 65ms. Translated into more musical terms, if the beat is represented by quarter notes (crotchets), a phase difference of 180° corresponds to half a beat (an 8th note), 90° corresponds to a half that difference again (a 16th note), and so on (Clayton et al 2005: 67). Therefore, the 94.75° discrepancy between the bell and piano equates to a difference of around a 16th note. Given the fast tempo of this excerpt (112 half-note bpm) this phase discrepancy is slight and falls very much into the micro-timing realm. Furthermore, is it also evident from this graph that the majority of phase discrepancies are considerably less: falling between -60° and 60°, a range of around 120° degrees or 100ms (somewhere between a 16th and 32nd note).

The phase plots in Figure 7.3 also show that the bass and piano do not consistently play ahead or behind, but rather that they enjoy a fluid phase relationship with the bell, shifting from ahead to behind and back again from moment to moment during the performance. This picture of relative phase is consistent with findings seen in jazz micro-timing studies where rhythm section musicians constantly re-orient themselves, "sliding in and out of phase with each other" (Prögler 1995: 43). It also echoes Keil's notions of musicians building a groove together in a slightly loose but organised, playful yet structured "egalitarian interactional style" where no one participant leads or dominates group interactions (Feld 1994 [1988]: 122).

Table 7.1 – Descriptive Statistics for Riamba Excerpt

Instruments	No. Shared Onsets	Min (ms)	Max (ms)	Range (ms)	Mean (ms)	SD (ms)
Bell and Bass	105	-59	102	161	27	21
Bell and Piano	179	-46	91	137	16	13

The descriptive statistics for this excerpt (table 7.1) suggest that phase variance is more pronounced in the bass rather than the piano, with piano mean and SD figures (16ms and 13ms) of nearly half that of the bass (27ms and 21ms). To shed more light on what these relative levels of variance might signify, an additional set of statistics is extremely useful: table 7.2 shows the number and percentage of onsets played behind and ahead of the bell, and the mean vector and length of mean vector calculations, derived from circular statistics. The mean vector is a measure of the average direction (ahead or behind expressed in degrees) where values between 0 and 180 degrees show that the bass/piano play behind the bell and values between 0 and -180 degrees indicate that the bass/piano play ahead of the bell. The length of mean vector is a measure of the strength of the mean vector, expressed as a value between 0 and 1, with 1 representing the strongest clustering of vectors around the mean (see Fisher 1993: 12). In the context of the present study, the length of mean vector, or mean resultant length as it is sometimes known, is used as a measure of the strength of phase synchrony between instrumentalists. Therefore, if the length of mean vector between the bell and bass, for example, was 1, this would indicate that these instrumentalists are playing in exact phase synchrony throughout the excerpt. A length of mean vector of 0 would indicate an asynchronous phase relationship between instrumentalists.

Table 7.2 – Additional Descriptive Statistics for Riamba Excerpt

Instruments	No. Onsets ahead	No. Onsets behind	% ahead	% behind	Mean Vector (degrees)	Length of Mean Vector
Bell and Bass	41	64	39.05	60.95	6.677	0.924
Bell and Piano	87	92	48.60	51.40	3.545	0.925

These statistical summations (table 7.2) show that the bass and piano both have a tendency to play behind the bell, but that the bass plays behind the bell a higher proportion of the time: 60.95% and 51.40% of the time respectively. The mean vector

statistics confirm this tendency with the bass playing behind the bell by 6.677° and piano playing behind the bell by 3.545°. Interestingly, the length of mean vector measures for the bass and piano are virtually identical at 0.92, suggesting that although the bass and piano are playing slightly out of phase with the bell and by different proportions, they have a tight, highly synchronised relationship to it, as one might expect from a rhythm section that works collectively to generate an effective groove.

To gain a musician's perspective of relative phase, I asked Hamish Balfour, the English jazz and *salsa* pianist who played on this excerpt, if he consciously played ahead or behind during *montuno* sections. He said that:

> I hear some Cuban piano players and I try and sometimes emulate this. It's really quite lazily played, yeah almost behind the beat...where the bass is just always on that tumbao kind of thing...I think the piano...it needs to be on the beat but still with that lazy feel. When I'm talking about this lazy thing still absolutely nailing it in time but just almost swinging really...if it's pushing it doesn't work...I'll leave that to the bass (Hamish Balfour, interview, 9/4/09).

His comments clearly indicate that he has the intention, formed by emulating Cuban pianists, to play on the beat but with a "lazy...almost behind the beat" feel. In addition, he perceives the bass as being the instrument that pushes, not the piano. There is a correlation between his intentions and way in which he actually plays: he does "nail it in time" enjoying a tight synchronous relationship with the bell and his "almost behind, lazy feel" translates into playing very slightly behind the bell (51.40% of the time) throughout the excerpt. It is notable however that playing behind the bell 51.40% is not statistically significant and it could be argued therefore that he is actually playing on the beat, or as he puts it: "almost behind".

Interestingly though, his perception of the bass pushing does not correlate with the timing data, as the bass actually plays behind the bell and piano a higher proportion of the time. There are three possible explanations for this. First, making accurate phase judgements by ear is extremely difficult: as can be seen in figure 7.3 relative phase is continually shifting emphasis, moving from ahead to behind and back again. I was the bass player on the above excerpt and even after repeated listening I could only form the vaguest of opinions about the phase alignment of my own playing in relation to the other instrumentalists.

Second, the amount any one instrument plays behind is very small and may be therefore imperceptible: a mean vector of 6.677° in the bass equates to an average of 27ms, and 3.545° in piano equates to an average of 16ms (table 7.1). These figures are well below the perceptible threshold proposed by some music psychologists. London (2004: 27), for example, suggests "the shortest interval that we can hear or perform as an element of rhythmic figure, is about 100 milliseconds (ms)". However, as London points out, precise thresholds are unclear as they are derived largely from experimental situations and may lack "ecological validity relative to real-life listening situations" (London 2004: 28). Findings from other studies of music perception suggest that timing discrepancies of as little as 20-30ms are detectable by listeners (Butterfield 2010; Clarke 1999; Iyer 2002; Rasch 1988). This 20-30ms threshold appears to hold regardless of music training and stylistic preference (Butterfield 2010: 165) and may be a feature of human perception corresponding to the 30ms timescale of a phoneme found in speech perception (Iyer 2002: 401). According to these arguments, the 27ms phase discrepancy in the bass would fall broadly within the perceptible range. Whether these phase discrepancies reported above are perceptible or not in real-world ensemble performance situations is therefore uncertain and would require a dedicated study to provide a definitive answer.

Third, the excerpts used for analysis are very short at around 1 minute in length and represent a snapshot of a single performance. Perhaps, therefore, the timing data extracted from these excerpts are not an accurate representation of the more general phase trends that might be found across a number of performances by the same musician. Furthermore, it is probable that, within any given group, an individual's phase preferences are influenced by real-time interactions with co-performers, an issue explored further within the Havana Club Descarga group.

When I asked English percussionist Andy Martin, who played percussion on this excerpt, if he consciously played ahead or behind during *montuno* sections, he reinforced the idea that in Cuban dance music the bell is the timekeeper that provides a steady pulse, around which other rhythm section players should adjust relative phase. In his words:

> ...from a percussionist's point of view the bongo bell, you know, the cowbell, campana is the instrument to really just lay [it down]...if a band wants to keep on top of the beat the bongo bell can really just lay it down, this is what we're gonna do, off we go (Andy Martin, interview, 30/3/09).

However, the timing data for this excerpt suggests that he has a tendency to play ahead of the bass and piano, or perhaps more accurately the bass and piano have a tendency to play behind him, as he is the principal timekeeper. The precise reason for this apparent disparity between the phase timing data and Andy Martin's comments is unclear. It could be one or more of the factors cited above, or perhaps at this point in the performance he felt the groove was dragging and was therefore trying to push the tempo forward by playing ahead, as his comments later in the same interview suggest: "it can [the campana], of course, be heard quite clearly and push, drive the band on...I think the campana can drive the band on" (Andy Martin, interview, 30/3/09). Later during the same

interview, Andy Martin explained why he felt real-time phase negotiations were essential in producing a groove with the 'correct' aesthetic:

> Pushing and pulling it's one of those things...some of the greatest bands or greatest recordings are because there is tension between certain instruments. It's not that one person is rushing or one person is dragging...a drummer might just slightly edge back on the beat and, you know, a guitarist or a pianist or whoever might be slightly on top of the beat. You get this slight separation but it's not enough for it to fall apart and disrupt the groove...but it is enough actually to create a unique feel, and it creates this tension of pushing and pulling...I think the music has this lifting and forward moving feel. It doesn't necessarily mean it's rushing but it's got a forward movement (Andy Martin, interview, 30/3/09).

Andy Martin's comments are pertinent. He speaks of the "pushing and pulling", and "tension" created by parts that are played slightly out of phase, and how this tension lends a unique "lifting and forward moving feel" to the groove. A Cuban pianist I spoke to in Spain made a very similar point when speaking of her phase preferences. She used the metaphor of "stretching" the timing to convey a sensation of internal tension created by micro-timing phase relations between instrumentalists: "it is as if you stretch it...pull it a bit! It is as if you hold it up a little bit, just a few hundredths, the sensation of the syncopation, you should stretch it" (Imilka Fernandez de Posada, interview[7.1], 23/2/10). These comments suggest that continual real-time phase adjustments between interacting musicians are necessary to maintain a feeling of tension, forward momentum, vibrancy and the desired aesthetic in the Cuban dance grooves. This adds another dynamical layer to the tension-and-release aesthetic embodied within key rhythms such as the *clave* and other rhythm sections *tumbaos* (see chapters 4 and 5).

Excerpt Two: Havana Club Descarga, Muñeca

When viewing the graph for the second excerpt, 'Muñeca' by Havana Club Descarga, a similar picture of relative phase emerges to that seen in the Riamba excerpt, with relative phase falling between -60° and 60°. Figure 7.4 indicates that within this group the bass and piano also enjoy a fluid phase relationship with the bell, moving from ahead to behind and back again throughout the excerpt.

Table 7.3 – Descriptive Statistics for Havana Club Descarga Excerpt

Instruments	No. Shared Onsets	Min (ms)	Max (ms)	Range (ms)	Mean (ms)	SD (ms)
Bell and Bass	130	-57	32	90	14	11
Bell and Piano	105	-67	91	158	27	19

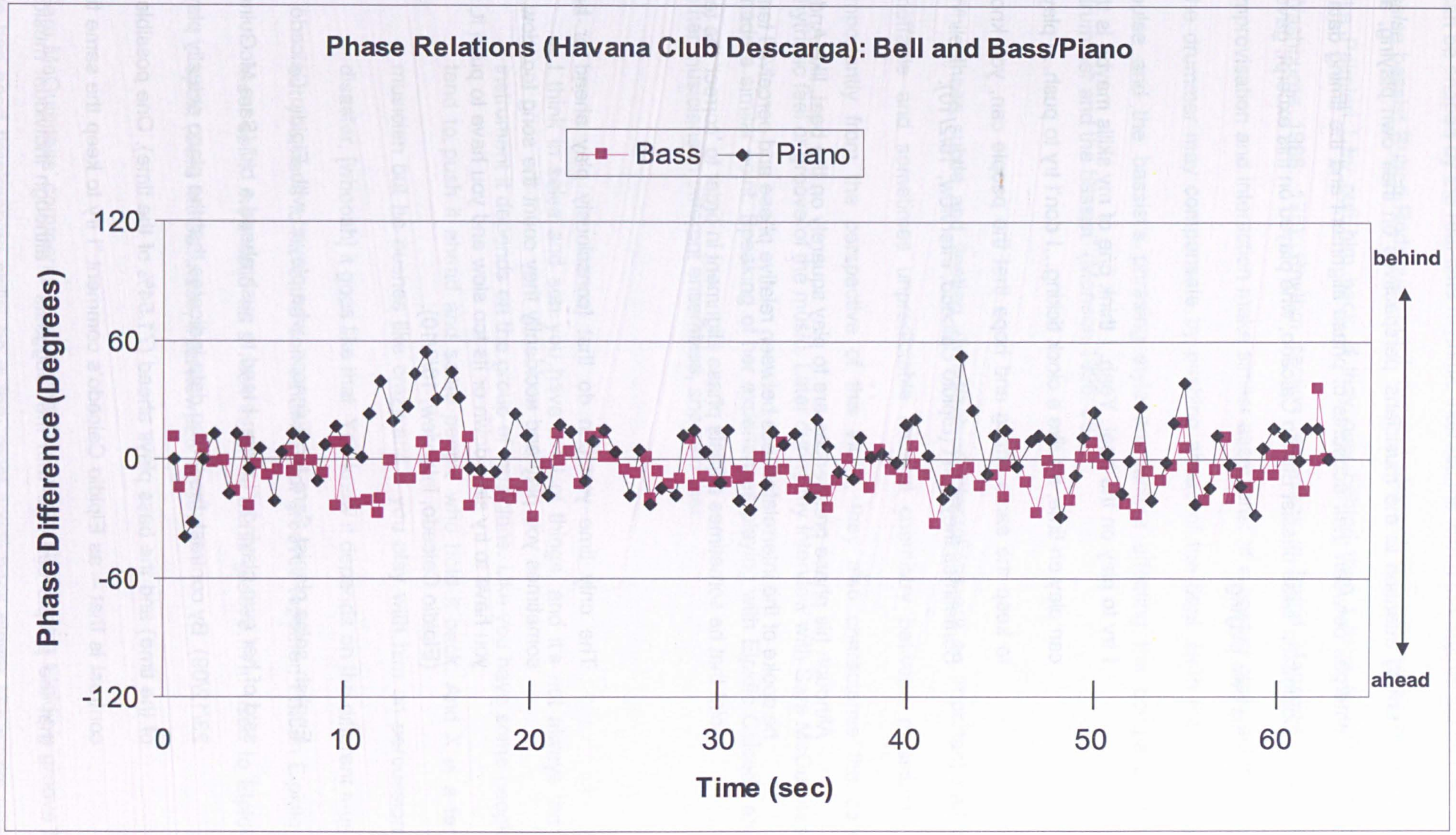
The descriptive statistics for this excerpt (table 7.3) show a reversal of the situation seen with Riamba where phase variance was more pronounced in the bass rather than the piano. Here, the piano shows a more pronounced variance, with mean and SD piano figures of 27ms and 19ms nearly double that of the bass (14ms and 11ms).

Table 7.4 – Additional Descriptive Statistics for Havana Club Descarga Excerpt

Instruments	No. Onsets ahead	No. Onsets behind	% ahead	% behind	Mean Vector (degrees)	Length of Mean Vector
Bell and Bass	93	37	71.54	28.46	-6.038	0.982
Bell and Piano	42	63	40.00	60.00	3.921	0.951

The additional descriptive statistics shown above in table 7.4 provide a much more detailed overview of phase relationships. They indicate that the bass has a tendency to play ahead of the bell, 71.54% of the time, while the piano has a tendency to play behind the bell 60% of the time. The mean vector statistics confirm this tendency with the bass playing ahead of the bell by -6.038°, and the piano playing behind the bell by 3.921°. The length of mean vector measures for the bass and piano, 0.982 and 0.951 respectively, correlate with the phase timing data, suggesting that the bass has a slightly tighter relationship with the bell than the piano and moves around less.

Figure 7.4 – Phase Relationships (Havana Club Descarga): Bell, Bass and Piano from the Montuno Section of Muñeca (1m 4s)



Turning attention to the musicians' perspectives on their own playing, again a disparity emerges between their accounts of phase alignment and the timing data. London-based Columbian *salsa* bassist Elpidio Caicedo, who played on this excerpt, gave this account of his own playing:

> I try to play on the beat. Yeah, I think one of my skills maybe is that the way you can play on time, it's like a clock ticking...I don't try to push...I play the same. I try to keep the same timing and hope that the people can, you know, go with me. Sometimes they don't (Elpidio Caicedo, interview, 16/2/10).

Although his phase preferences are to play squarely on the beat, like Andy Martin earlier, he spoke of the interrelatedness between relative phase and perceived tempo, making the point that he sometimes adjusts phase alignment in order to 'correct' the tempo of a tune:

> The only time you can do that [consciously play ahead or behind] is when sometimes you play and accidently they count the song too slow or too fast and you have to try slow down or its too slow and you have to push it, a little bit faster (Elpidio Caicedo, interview, 16/2/10).

English *salsa* pianist Sara McGuinness, who played with Elpidio Caicedo on the excerpt, said of her own playing: "I mean I tend to push ahead a bit" (Sara McGuinness, interview, 23/12/09). By contrast, the timing data indicates that the piano actually plays behind (60% of the time) and the bass plays ahead (71.54% of the time). One possible reason for this contrast is that – as Elpidio Caicedo's comment "I try to keep the same timing and hope that the people can...go with me" suggests – although individual musicians may have phase preferences that contribute to their own particular playing style, these preferences

can be shaped by the real-time rhythmic interactions within the rhythm section. As another *salsa* bassist Ruben Rodríguez put it: "when I play with a pianist who pushes the tempo like Palmieri I try pull him back. If they play behind then I have to push" (quoted in Washburne 1998: 175). Rhythm section musicians in Ingrid Monson's study of jazz improvisation and interaction make similar assertions: "if a bassist plays behind the beat, the drummer may compensate by pushing ahead of the beat. Both the location of the pulse and the bassist's phrasing style are factors affecting the compatibility of the drummer and the bassist" (Monson 1996: 56).

While these subtle and fleeting ahead/behind interactions are an important part of the ineffable and sometimes unpredictable musical chemistry between musicians, more importantly from the perspective of this study, they also characterise the collective rhythmic feel or groove of the music. Later during my interview with Sara McGuinness she made a similar point. Speaking of her experiences playing with Elpidio Caicedo and with other musicians in different ensembles, she said that:

> I think in salsa and son you have a lot of things, and it's not always the same instrument it depends on the group of musicians. Like you have some people who tend to push it ahead and some people who hold it back. And X is a fantastic musician but he pushes like crazy and if you play with him on percussion it's a disaster, [whoosh] it goes like that. You know it depends on the different musicians but you have to have the combination that grooves together. I mean Elpidio is the most solid...he's solid as a rock in terms of his groove...I'm used to Elpidio, I'm spoilt (Sara McGuinness, interview, 23/12/09).

Sara McGuinness' comments suggest that the reason she prefers Elpidio's groove is that he has good timekeeping skills: he is the "most solid" bass player she works with. It is

notable that Elpidio's instantaneous tempo profile does not show that his playing is significantly more rhythmically stable than the other bass players featured (see chapter 6). However, the phase plots, the accompanying statistics (particularly the length of mean vector at 0.982) and his own evaluation of his playing style indicate that this perceived solidity in his playing is due to the synchronous relationship he enjoys with the timekeeping instrument. In other words, he is locked in tightly with the bell and when he does shift ahead or behind it is by relatively small amounts and in a controlled manner. This point is speculative, and would require a detailed comparison of Elpidio's timing data with that of a number of bass players with similar levels of experience, enculturation etc. to prove conclusively. It does however shine a light on how the intricate and personalised micro-rhythmic and micro-timing interactions among rhythm section musicians can shape the collective groove.

Excerpt Three: Asere, Habanera

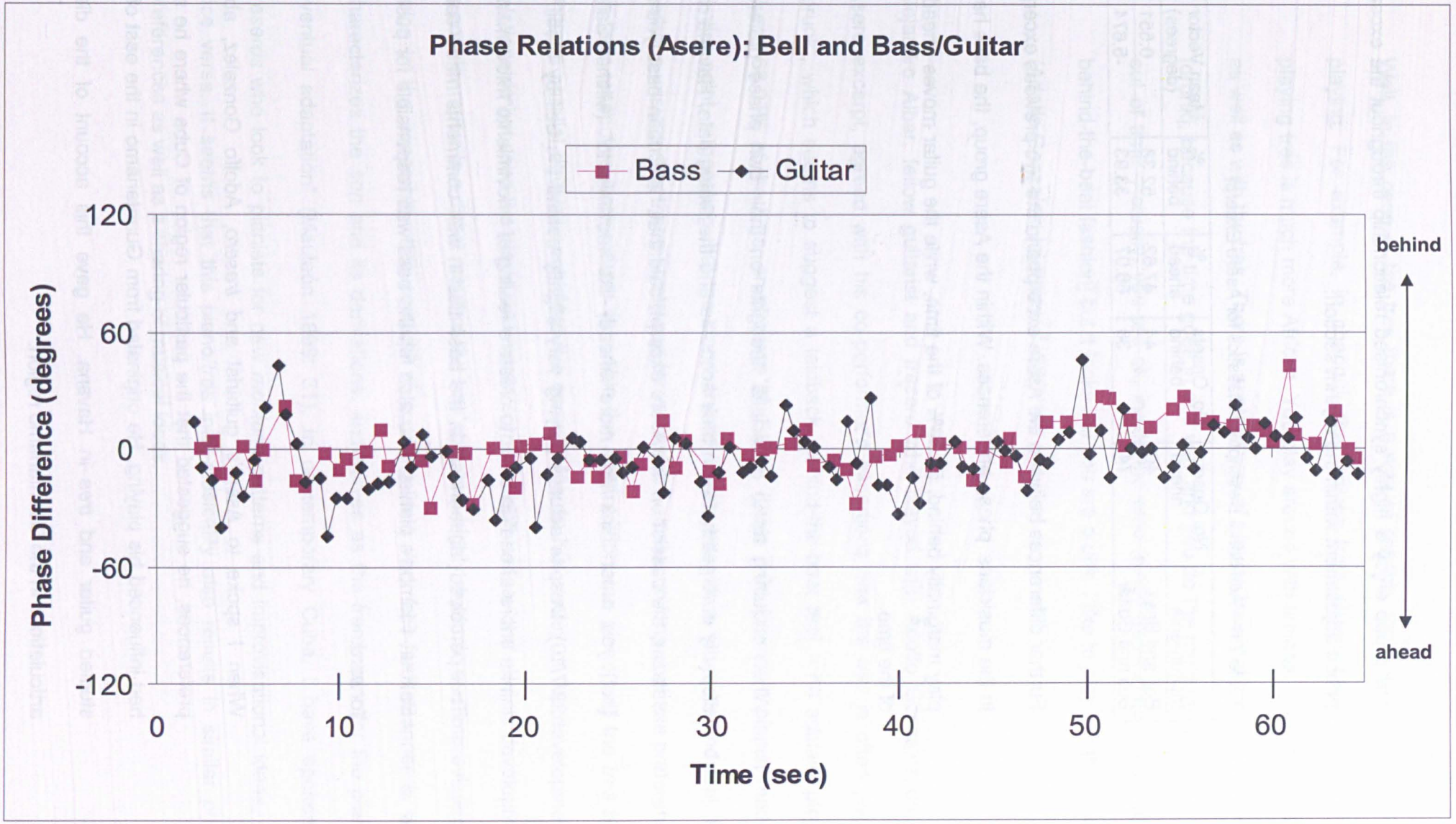
Phase plots for the third excerpt, Habanera by Asere (figure 7.5), shows a similar trend to that of the previous two, with phase discrepancies in the bass and guitar falling within the -60° to 60° degree range as they move fluidly around the steadying presence of the bell.

Table 7.5 – Descriptive Statistics for Asere Excerpt

Instruments	No. Shared Onsets	Min (ms)	Max (ms)	Range (ms)	Mean (ms)	SD (ms)
Bell and Bass	84	-45	63	109	19	15
Bell and Guitar	112	-66	52	117	19	14

Differences between the three groups become apparent when viewing the descriptive statistics. Whereas for Riamba and Havana Club Descarga the bass and piano showed mean and SD figures of around half respective to each other (see tables 7.1 and 7.3), for Asere these figures for the bass and guitar are identical, sharing a mean of 19ms and a SD of around 15ms (table 7.5). When considered with a length of mean vector measure of around 0.96/0.97 (table 7.6) these figures suggest that the three instrumentalists within

Figure 7.5 – Phase Relationships (Asere): Bell, Bass and Guitar from the Montuno section of Habanera (1m 6s)



this group enjoy a highly synchronised relationship throughout the excerpt with minimal phase adjustment within the rhythm section.

Table 7.6 – Additional Descriptive Statistics for Asere Excerpt

Instruments	No. Onsets ahead	No. Onsets behind	% ahead	% behind	Mean Vector (degrees)	Length of Mean Vector
Bell and Bass	40	44	47.62	52.38	0.551	0.974
Bell and Guitar	74	38	66.07	33.93	-5.674	0.964

Further differences between the Asere excerpt and the two previous excerpts can be seen in the musicians' phase preferences. Within the Asere group, the bass has a tendency to play marginally behind, 52.38% of the time, while the guitar moves ahead of bell 66.07% of the time.

When enquiring as to musicians' thoughts on their own phase preferences, again a disparity emerges between their accounts and the timing data. Havana musician, Michel Salazar, the bassist on the Asere excerpt, said that, "in Cuban bass you must be in time [but] you must think like more ahead, like movimiento" (Michel Salazar, interview, 23/7/10). Despite actually playing very slightly behind the bell by 0.551° (table 7.6) he thinks "more ahead" in order to create a feeling of "movimiento"/movement in the groove. This perceived 'aheadness' in the bass ties in with comments made earlier by Hamish Balfour, Riamba's pianist, who also felt the bass was responsible for pushing the groove forward.

When I spoke to Asere's guitarist and *tresero*, Adolfo Gonzalez, about his phase preferences, he suggested that the particular region of Cuba where he studied the *tres* had influenced his playing. He originated from Guantanamo in the east of Cuba but also studied guitar and *tres* in Havana. He gave this account of the distinctive phase articulations in the Guantanamo region:

> Well, in the case of the tres there is a way of playing, there are many ways of playing. For example, in changüí, that comes from Guantanamo, the way of playing tres is much more African. You play around with timings, in the percussion as well as with the tres. There is another way of playing tres that is called borracho [drunk], because the time goes in one way and you do the melodies as if you are out of time. Actually, you are ok, inside the time [sings *tres* tumbao in dragging behind-the-beat fashion] but it looks like you are drunk. I like to play like that, drunk (Adolfo Gonzalez, interview[7.2], 23/7/10).

Alejandro Albar, fellow guitarist and *tresero* who played with Adolfo Gonzalez on the Asere excerpt, agreed with his co-performer's assertions that the *tres* is often played "drunk", which seems to suggest a laidback, behind-the-beat feel – he actually played ahead 66.07% of the time, an average of -5.674° (table 7.6). Riamba's pianist made a similar point, suggesting that the piano should be played with a 'lazy', behind feel. It is perhaps unsurprising that pianists and *treseros* share similar notions of phase preferences on their respective instruments, as, within the *son* tradition, the piano and the *tres* have enjoyed parallel development since the early 1940s. In her survey of the developmental relationship between the piano and *tres* in *son*, Mauleón writes: "the piano's development in popular music is a direct result of the *tres'* role as a highly rhythmic and improvisational voice in the ensemble...this concept of comping in a very free-form manner is what characterizes the *son* and its derivations, and serves as the framework for the piano's eventual adaptation" (Mauleón 1999: 31). In contemporary Cuba, I have spoken to *treseros* who look to pianists for new *montuno* patterns and improvisational ideas, and vice versa. It seems that this piano/*tres* inter-musicality also results in similar phase preferences as well as a sharing of musical ideas.

Summary and Conclusions

The above micro-timing data indicates that rhythm section instrumentalists play "in synchrony but out of phase" with each other, as Keil's theory of PDs proposes. The level of phase discrepancy and synchronisation within the three groups falls between -60° and 60°, a range of around 120°, suggesting that phase adjustments are not fluctuating randomly, rather that they are executed in a controlled and culturally prescribed manner. Further commonalities across the three excerpts can be seen in the mean phase discrepancy statistics, shown below in table 7.7.

Table 7.7 – Mean Phase Discrepancies for the Three Excerpts

	Riamba		Havana Club Descarga		Asere	
Instrument/Avg.	Mean (ms)	Mean Vector (°)	Mean (ms)	Mean Vector (°)	Mean (ms)	Mean Vector (°)
Bass	27	6.677 (behind)	14	-6.038 (ahead)	19	0.551 (behind)
Piano/Guitar	16	3.545 (behind)	27	3.921 (behind)	19	-5.674 (ahead)
Average	21	5.111	20	4.9795	19	3.1125

These summations suggest that bassists and pianist/guitarists within the three groups show very similar phase discrepancies from the bell of around 20ms or 4°. When compared with findings taken from micro-timing studies of jazz rhythm sections these summations are of some interest. For example, Prögler (1995: 39) found phase discrepancies of around 40ms on average between bass and drums, and Doffman (2008: 161) found phase discrepancies of around 6° on average between the bass and drums. While these comparisons should not be pushed too far as there are stylistic and tempo differences – Doffman's rhythm section tempi ranged from 124 to 240 bpm and Prögler's were a metronomic 120 bpm – these figures do suggest that rhythm sections performing related groove-based music enjoy similar levels of phase discrepancy, somewhere between 20ms to 40ms or 4° to 6°.

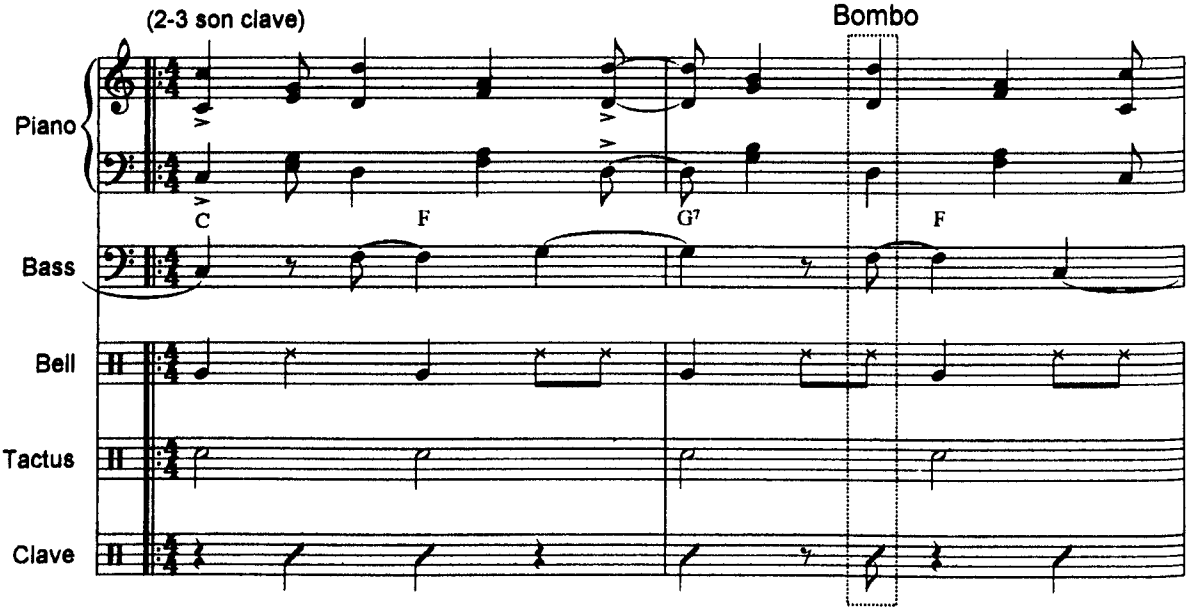
When timing data is considered together with musicians' verbal accounts of their own phase preferences an interesting picture begins to emerge. Verbal accounts suggest that although instrumentalists formulate general phase preferences, these preferences are subject to continual adjustment and readjustments as rhythm sections engage in real-time interactions in order to negotiate a collective groove. These real-time interactions and negotiations are crucial to groove as they create, at a micro-timing level, a dynamical tension and pushing, pulling and stretching of time that is associated with sensations of lift, forward motion and vibrancy. These aesthetic concerns help to explain why phase direction appears to be unique to each rhythm section. As can be seen in table 7.7, within Riamba the bass and piano tend to play behind the bell, within Havana Club Descarga the bass tends to plays ahead of the bell while the piano plays behind and, within Asere the bass tends to play slightly behind and guitar tends to play ahead. Therefore, statistical measures of phase direction and preference are reflective of, not just the individuals that comprise the rhythm section, but also of the real-time micro-interactions between those individuals as they work collectively to negotiate a groove that feels 'correct' and is aesthetically pleasuring.

Many factors may influence relative phase between rhythm section instrumentalists such as the role an instrument plays within the rhythm section (the timekeeping bell is in the 'centre' in two of the three excerpts), the perceived tempo (i.e. the tune feels too fast or too slow) and personal and stylistic preferences. However, interactive and aesthetic considerations appear to be paramount, that is, ensuring that the collective groove has the required sense of drive and forward momentum. The following section aims to uncover another dimension of this aesthetic: relative phase at one specific time point within the rhythmic-harmonic framework.

Phase Relationships at the Bombo: Bell, Bass and Piano/Guitar

Whereas the foregoing discussion explored relative phase between the bell, bass and piano/guitar throughout the entire excerpt for the three groups, this section focuses on relative phase at one specific time point within the repeated two-bar *clave* cycle: the *bombo*. The *bombo* occurs at the fourth eighth note on the three-side of the *clave*. Figure 7.6 shows the occurrence of the *bombo* along with the standard *tumbao* patterns, tactus and *clave*.

Figure 7.6 – Bombo and Standard Tumbao Patterns



The *bombo* (literally meaning 'bass drum') holds some significance within the rhythmic-harmonic framework of many styles of Cuban music. Along with the *ponche* (punch), which occurs on the fourth quarter note on the three-side of the *clave*, these time points, according to Peñalosa, are "two of the most important pulses in clave music; they do not coincide with a main beat and in many rhythms bombo and ponche are joined, functioning as a single motif" Peñalosa (2009: 47). He goes on to argue that the *bombo* and *ponche* are important and characteristic rhythmic features of Cuban styles ranging from the *contradanza*, popular in Cuba during nineteenth century, through to the contemporary *santería batá* performance and *son* and salsa styles. In addition, Mauléon argues that the *bombo* is one of the "essential accents" found in the key *tumbaos* of more eclectic Cuban and Cuban-derived styles like *songo* and *mozambique* (Mauléon 1993: 95-99) and

Leymarie postulates that Cuban percussionists tend to think of the *bombo* as the "strong accent of the *clave*" (Leymarie 2002: 192).

In the context of the current study, the *bombo* was chosen for phase analysis partly because of its significance within many Cuban musical styles, but also for concerns that are more pragmatic: it is the only time point within the two-bar cycle where the bell, bass and piano consistently share a common onset. Hence, the *bombo* represents a 'meeting point' in time, a position where instrumental parts that otherwise 'dance around' each other come together in hypothetical unison. The aim of the forthcoming analysis is, therefore, twofold: first, to determine whether relative phase changes at the *bombo* when compared to the relative phase for the entire excerpt; and second, to discover the affect this change might have on rhythm section groove. To do this, exactly the same excerpts, instruments, methods and analyses were used to calculate relative phase at the *bombo* as in the previous section. Therefore, as with the preceding section, each phase plot is accompanied by the two sets of complementary descriptive statistics.

Excerpt One: Riamba, 'El Cuarto de Tula'

Figure 7.7 shows *bombo* phase relations between the bell and bass/piano as they occurred within the repeated two-bar *clave* cycle throughout the Riamba excerpt. Initial inspection of relative phase (figure 7.7) indicates that phase differences are still evident between the bell and the bass/piano at the *bombo*. However, the range of phase difference has reduced considerably when compared to the phase differences for the entire excerpt: a reduction from around -60° to 60° (figure 7.3) to -10° to 10° (figure 7.7).

Figure 7.7 – Bombo Phase Relationships (Riamba): Bell, Bass and Piano

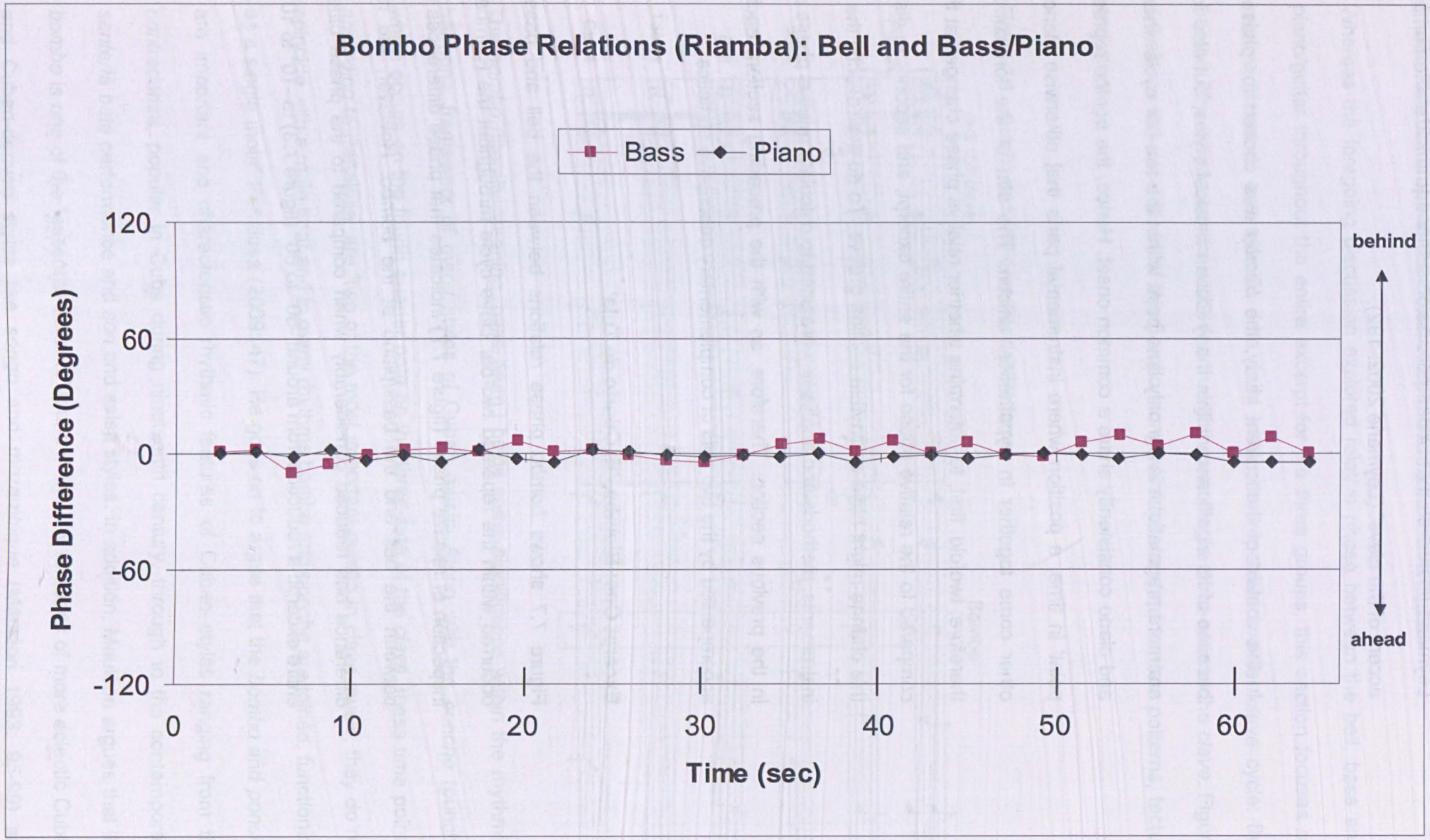


Table 7.8 – Descriptive Statistics for the Bombo: Riamba Excerpt

Instruments	No. Shared Onsets	Min (ms)	Max (ms)	Range (ms)	Mean (ms)	SD (ms)
Bell and Bass	30	-59	59	118	23	19
Bell and Piano	30	-30	13	43	12	9

Table 7.9 – Additional Descriptive Statistics for the Bombo: Riamba Excerpt.

Instruments	No. Onsets ahead	No. Onsets behind	% ahead	% behind	Mean Vector (degrees)	Length of Mean Vector
Bell and Bass	11	19	36.67	63.33	1.702	0.997
Bell and Piano	24	6	80.00	20.00	-1.58	0.999

The descriptive statistics confirm this trend, showing that the range has reduced from 161ms to 118ms in the bass and from 137ms to 43ms in the piano (tables 7.1 and 7.8 respectively). In more musical terms, the range has reduced from somewhere between a 16^{th} and 32^{nd} note to less than a 128^{th} note. Furthermore, the length of mean vector has increased by around 0.07 for the bass and piano, from 0.92 (table 7.2) to 0.99 (table 7.9), suggesting that, compared to the general trend seen for all the shared onsets, the three instrumentalists enjoy a higher level of phase synchrony at the *bombo*.

This statistical data strongly suggests that, within this group, the *bombo* functions not only as a hypothetical meeting point but also as a temporal meeting point, where rhythm section instrumentalists come together in heightened synchrony at each occurrence of the *bombo* within the two-bar *clave* cycle. Before discussing what this might mean in terms of groove, the phase timing data for the remaining two excerpts will be considered to see if similar trends emerge.

Excerpt Two: Havana Club Descarga, Muñeca

Figure 7.8 and tables 7.10 and 7.11 show the phase plots and accompanying descriptive statistics for the Havana Club Descarga excerpt.

Figure 7.8 – Bombo Phase Relationships (Havana Club Descarga): Bell, Bass and Piano

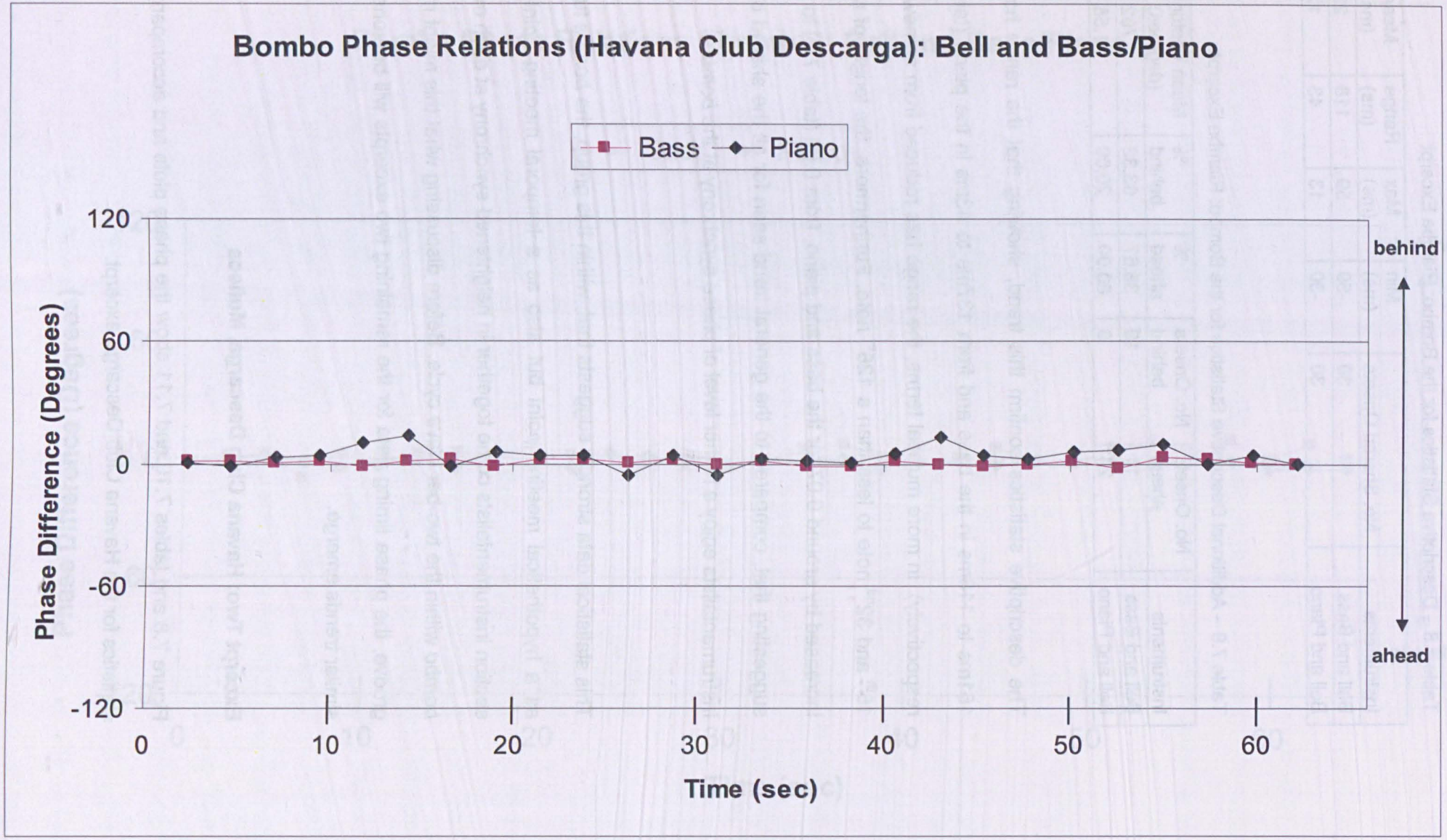


Table 7.10 – Descriptive Statistics for the Bombo: Havana Club Descarga Excerpt

Instruments	No. Shared Onsets	Min (ms)	Max (ms)	Range (ms)	Mean (ms)	SD (ms)
Bell and Bass	26	-12	23	35	9	6
Bell and Piano	26	-39	91	130	31	24

Table 7.11 – Additional Descriptive Statistics for the Bombo: Havana Club Descarga Excerpt

Instruments	No. Onsets ahead	No. Onsets behind	% ahead	% behind	Mean Vector (degrees)	Length of Mean Vector
Bell and Bass	10	16	38.46	61.54	0.678	0.999
Bell and Piano	6	20	23.08	76.92	3.386	0.997

A strikingly similar picture of *bombo* phase relationships emerges for the Havana Club Descarga excerpt. Once again, the range of phase difference has reduced from between -60° to 60° for the entire excerpt (figure 7.4) to around -10° to 10° at the *bombo* (figure 7.8), from 90ms in the bass to 35ms, and from 158ms to 130ms in the piano (tables 7.3 and 7.10 respectively). The length of mean vector also shows a marked difference, increasing from 0.982 in bass to 0.999, and from 0.951 to 0.997 in the piano (tables 7.4 and 7.11 respectively). This 0.031 increase in the length of mean vector is again suggestive of heightened synchrony between the three instrumentalists at each *bombo* time point within the clave cycle.

The bass in particular enjoys a highly synchronous relationship with the bell, with a length of mean vector of 0.999. This level of synchrony between the bell and bass is consistent with the suggestion made in the previous section that Elpidio Caicedo, the bassist who played on the Havana Club Descarga excerpt, is perceived as solid by his co-performers because he is locked in tightly with the bell. Perhaps then, this perceived solid nature of his playing is due to his ability to not only lock in with the timekeeping instrument throughout the entire two-bar *clave* cycle but also his ability to lock in with the timekeeper at key time points within each *clave* cycle. The *bombo* then, appears to be an important point of interactional focus between musicians.

Excerpt Three: Asere, Habanera

Figure 7.9 and tables 7.12 and 7.13 show the phase plots and accompanying descriptive statistics for the Asere excerpt.

Table 7.12 – Descriptive Statistics for the Bombo: Asere Excerpt

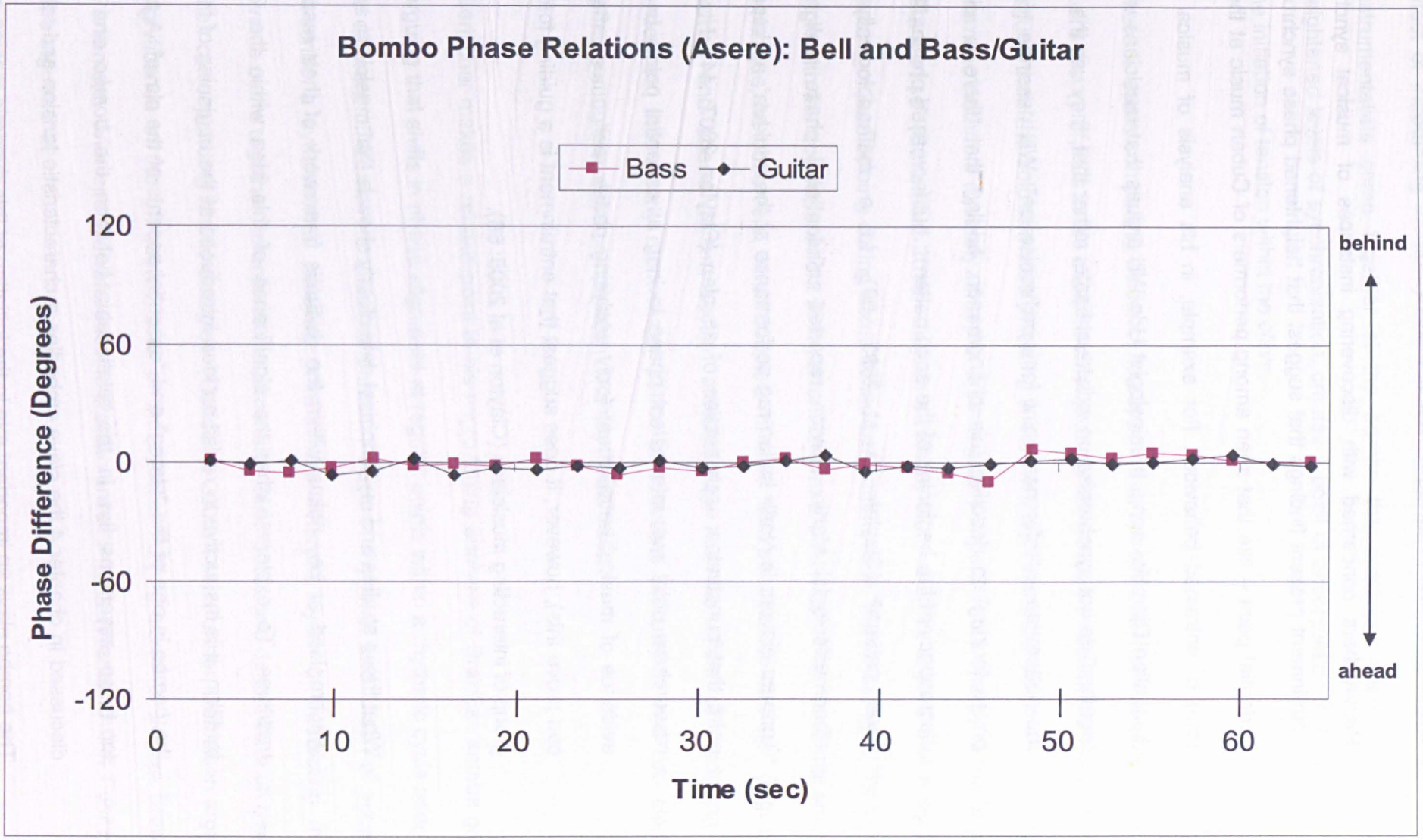
Instruments	No. Shared Onsets	Min (ms)	Max (ms)	Range (ms)	Mean (ms)	SD (ms)
Bell and Bass	27	-62	41	104	20	15
Bell and Guitar	28	-42	22	64	15	10

Table 7.13 – Additional Descriptive Statistics for the Bombo: Asere Excerpt

Instruments	No. Onsets ahead	No. Onsets behind	% ahead	% behind	Mean Vector (degrees)	Length of Mean Vector
Bell and Bass	17	10	62.96	37.04	-0.918	0.998
Bell and Guitar	17	11	60.71	39.29	-1.019	0.999

Phase plots for the Asere excerpt show a very similar trend to that of the previous two, with a reduction in the range of phase difference from around -60° to 60° (figure 7.5) to -10° to 10° (figure 7.9). A further similarity between Asere and the previous two groups is an increase in the level of synchrony between instrumentalists, as indicated by the length of mean vector: increasing from 0.974 to 0.998 in the bass and 0.964 to 0.999 in the guitar (tables 7.6 and 7.13), a difference of around 0.03. Again, these statistical measures are suggestive of heightened synchrony between the bell, bass and guitar at the *bombo* when compared to overall phase synchrony throughout the entire excerpt. Given that some researchers argue exact synchrony between groups of performing musicians is unachievable – "beyond the limits of human skill and perception" (Goodman 2002: 155; see also Iyer 2002 and Rasch 1988) – these levels of synchrony are striking and significant. The following discussion considers the significance of these findings in relation to notions of entrainment and groove.

Figure 7.9 – Bombo Phase Relationships (Asere): Bell, Bass and Guitar



Synchronisation, Entrainment and Groove

Researchers concerned with discovering instances of musical synchronisation and entrainment present findings that suggest that heightened phase synchrony at a specific cadential point – like that seen among performers of Cuban music at the *bombo* – is a form of entrained behaviour. For example, in his analysis of musical entrainment in Australian Djambidj song, musicologist Udo Will argues that musicians who are "playing together" do not synchronise on individual beats, rather that, they use the starting point of the pattern as a "reference point for synchronisation". Will uses the term "intermittent phase locking" to describe this phenomenon, adding that "there is minimum [phase] discrepancy at the beginning of the each pattern...but increased phase differences within each pattern" (Clayton et al 2005: 69). In a methodologically-related study, ethnomusicologist Martin Clayton reported unintentional phase realignment between Tanpura players in North Indian rag performance at the 'mukhra', an important cadential point that punctuates each section of an alap (Clayton 2007: 44). However, as both researchers point out, intermittent phase locking at cadential points is not conclusive evidence of musical entrainment (only analysing phase realignment after perturbations can prove this), however, it does suggest that entrainment is a guiding force that unites a group of interacting musicians (Clayton et al 2005: 66).

What these studies and my empirical data clearly show is that musicians are more closely synchronised at key points within the rhythmic framework of their respective musical traditions. To explore further the significance of this idea within the Cuban musical tradition, it is instructive to revisit an idea introduced at the beginning of this section, that the *bombo* is one of the "strong" and "essential accents of the clave". A possible reason for these assertions lies in the relationship between the *bombo* and the *clave*. As discussed in chapter 4 the *clave* embodies a characteristic tension-and-release dynamic. The *bombo* plays an important role in the initiation of this dynamic tension as it falls on the second *clave* stroke in a 3-2 sequence, i.e. the first syncopated *clave* stroke that has the

effect of introducing instability and tension to the pattern. Perhaps as rhythm section instrumentalists come together at the *bombo* the combined energy, generated by heightened levels of synchronisation, creates a point of accentuation that helps reinforce the initiation of tension within the *clave*.

There is some compelling evidence to support this speculation. For example, drawing on Keil's theory of PDs in his exploration of jazz rhythm section-soloist interaction, Butterfield argues that "the soloist whose phrasing is consistently behind the pulse and then for one dramatic instant is squarely on top of it strategically imparts more energy to the becoming of a phrase" (Butterfield 2010: 169). In a related study, Ashley argues that a significant feature of jazz soloing during some ballad performances is "the tendency of the soloist to align with the accompaniment at important cadential positions". This "cadential anchoring" technique, he observers, when coupled with the "delay/accelerate strategy" (e.g. playing behind and ahead rhythm section articulations), has the effect of producing "mini-cadences" that clearly mark major points of structural articulation and can clarify the "phrase structure of the composition" (Ashley 2002: 320).

Gerischer makes a related point in his micro-timing analysis of Brazilian samba grooves, arguing that shifts in phase alignment at regular points within a rhythmic cycle adds stress to different off beats. He uses the phrases "clash of rhythms" and "clash of accents" to describe a synchronous meeting point where different layers of interacting rhythmic events come together "to enforce the dimension of off beats and double-time off beats and their corresponding kinetic energies" (Gerischer 2006: 114). Further, Danielsen argues the significance of the oft-quoted 'one' in the cyclical Funk grooves of James Brown and Parliament. With specific reference to Parliament's "P-funk (Wants to Get Funked Up)" she argues that:

> the One has grown so big, so heavy, that we may almost speak of a slow layer of pulses consisting of just one heavy beat, carrying enough power to influence the whole groove...[the One] absorbs all of the musical energy like a black hole, locking us into the groove (Danielsen 2006: 169).

Butterfield, Ashley, Gerischer and Danielsen's arguments that key cadential and synchronous meeting points within the rhythmic framework of groove-based musics have a heightened presence, perceived energy, heaviness and power, and that this energy has, in Danielsen's words, "enough power to influence the whole groove", suggest that the *bombo* plays a significant role by initiating the tension-and-release dynamic of the *clave* during performance situations.

Perspectives from cognitive psychology help to explain how heightened synchrony at the key structural points within a rhythmic framework, such as the *bombo* in Cuban dance music and the 'one' in Funk, might grab a listener's attention within the dynamical groove. As detailed at the beginning of chapter 6, Mari Riess Jones and her colleagues theorise that participating listeners employ a complex of internal oscillations, or attending rhythms, that entrain to the time patterns of external rhythmic events to achieve the desired degree of synchrony. An important aspect of Jones' theory is the notion that attending rhythms are adaptive and capable of shifting attentional focus towards different salient metric features within a rhythmic framework. Perhaps then, the *bombo* represents one such salient feature, its increased presence and energy functioning as a type of 'perceptual accent' that "draws attention to itself in the auditory scene" (Iyer 2002: 402). The full effect of this perceptual accent is realised when the *bombo* occurs continuously within a repeated *clave* cycle. At each recurring time point within this cycle, the *bombo* helps to focus momentarily the listeners' attention on the second *clave* stroke, thus highlighting an important structural and aesthetic feature of the groove: the initiation of tension within the *clave* pattern.

In addition, it is conceivable that the perceptual salience of the *bombo* interacts with other important rhythmic features detailed in chapter 5, such as the anticipatory effects of bass and piano *tumbaos*. As musicians focus their attentional and rhythmic energies on the *bombo*, the same rhythmic time point that initiates the anticipated bass and piano effects on the three-side of the *clave*, they may add weight to or enhance these anticipatory effects. This notion helps explain why musicians sometimes refer to the three-side of the *clave* as *fuerte* (strong) and the two-side as *débil* (weak) (Peñalosa 2009: 104; Roberts 1992: 8). The continuous alternation of weak-strong, call-and-response and tension-release in *clave*, enhanced by the anticipatory effects of bass and piano and supported by the rhythmic synchronised energy at the *bombo*, can be said to have a combined effect, working together to add a sense of flow and forward motion to the collective groove.

I found no conclusive evidence that enculturated musicians are explicitly aware of the relationship between groove and these expressive micro-timing and rhythmic effects at the *bombo*. However, there is some evidence of an embodied level of awareness. Andy Martin, Riamba's percussionist, made a similar point, describing a feeling of bodily 'lift' in the groove at the *bombo*:

> I think the music has this lifting and forward moving feel. It doesn't necessarily mean it's rushing but it's got a forward movement because of, for example, the bombo, the bass drum...the bass guitar playing the tumbao, on the and of 2 and on beat 4, you know, you've got, strong up beats...perhaps the bombo, kick drum, gives it this feel. You've also got...the piano playing syncopated patterns which again gives it that lifting feel. So I guess collectively it creates this forward feel. Even though in theory it's going at a uniform speed (Andy Martin, interview, 27/1/10).

Andy Martin touches upon many of the points made in this chapter: the "forward moving feel" in music, created by the "strong up beats", the combined rhythmic effect of the syncopated bass and piano *tumbaos*, and the feeling of 'lift' in the music at the *bombo*. Later during the same interview, I showed him video footage of his performance and pointed out that he appears to move his body repeatedly forward and upward when playing the *bombo* on the bass drum. I asked him if this was something that he consciously did. He said that:

> I think it's important as long as you're feeling it in a natural way. I don't think you should consciously be thinking 'oh at this particular point, at this particular note I should thrust my shoulders forward' because it kind of looks the thing to do. I think if you can naturally feel the music which creates a natural dance or a natural, shall we just say, movement within yourself, I think that is a good thing. I refer to the same point again about the and of beat two...the bombo note...I like to move my body forward at that point. Almost like, just a gentle sway into that bass drum note (Andy Martin, interview, 27/1/10).

For Andy Martin, the *bombo* clearly holds some embodied significance within the groove of Cuban dance music, and comments such as "I think if you can naturally feel the music which creates a natural dance or...movement within yourself" suggest that his bodily movements are an intuitive response to a 'felt' accentuation within the groove. It could be that his shoulder movements are in some way related to physical movement elsewhere in his body (he was playing the *bombo* with his leg/foot on the bass drum at this point). However, when his comments are considered with findings presented in this and previous chapters, it is more likely that his shoulder movements are an embodied and sympathetic response to the synchronous micro-timing accent of the *bombo* and to the various dynamic rhythmical features that comprise the rhythmic-harmonic framework. Therefore, by moving in response to the *bombo*, Andy Martin is conveying to the onlooker more than

just his intuitive sense of how the groove feels to him, he is also communicating crucial cultural, structural, temporal, dynamical and aesthetic features of the rhythmic framework, features that play a crucial role in groove production.

Summary

To summarise the main points in this chapter, phase relationships between rhythm section instrumentalists play a vital role in collective groove production of *son* and salsa styles. These interactive real-time phase adjustments create a dynamical pushing and pulling of time that evokes sensations of tension, forward momentum and drive within participants. The *bombo* is also of some significance to collective groove production. It acts as a synchronous meeting point for rhythm section instrumentalists where their combined rhythmic and communicative energies unite to create a natural accentuation that helps reinforce the initiation of tension within each *clave* cycle and interacts with other cyclical *tumbaos* within the rhythmic-harmonic framework. The *bombo* may also provide an important perceptual accent, momentarily grabbing listeners' attention each time it occurs within the cyclical groove, thereby marking important cultural, structural and aesthetic features within the music. The continuous timing adjustments from a relatively loose phase synchrony for all shared onsets to a tighter phase synchrony at the *bombo* suggest that the bass and piano/guitar are entrained to the bell, and that musical entrainment is a key process that shapes interactive and collective groove production within the rhythm section.

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Chapter 8

Group Tempo

After previously investigating instantaneous tempo and phase relationships at a micro-timing level, this chapter expands the focus to explore macro-level temporal features for the three groups. The principal aims of the forthcoming exploration of group tempo are twofold: firstly, to use empirical measures to identify temporal trends that characterise the performance of *son* and salsa styles; and secondly, to use ethnographic data to uncover the processes that underpin these performance characteristics. In addition, the relationship between group tempo, aesthetics and collective groove production will also be explored.

This exploration proceeds in four main sections. After a more general discussion of the function of tempo in music performance, the first section details the amount by which overall group tempo varies throughout the length of three performances. The second section considers the degree of within-tune tempo variability in the same performances. The third section explores how group tempo varies in relation to performance structure, specifically in relation to the transition between *son* and *montuno* sections. And the final section uses macro- and micro-timing data and ethnographic accounts to uncover instances of socio-musical synchronisation and entrainment within the rhythm section.

Tempo and Performance

It seems foolish in a study of groove and performance aesthetics such as this to exclude an investigation of tempo, or "the *rapidity of the beat* or pulse" (Gabrielsson 1988: 32). Musicians devote a great deal of time to discovering the correct tempo at which a particular tune 'sits' best and many music scholars underscore the importance of the function of tempo in a variety of musical systems. In his cross-cultural study of tempo, for example, Epstein writes that:

> Tempo exerts one of the most powerful controls in music...tempo is a universal concern, for without it a performance is handicapped, at the least. Tempo exerts a master control over the unfolding of all elements of a work – themes, phrases, harmonic progressions, sections, overarching relations, proportions. Unfolded at the "right" pace these fit naturally together (Epstein 1985: 34-35).

Scollon (1981) puts forward a similar yet broader argument, suggesting that tempo plays an important role in binding ensembles together during both musical and other types of real-time interaction:

> Tempo is the temporal bond that allows us to move together in real time. It gives us an account of the immediate past and a basis for predicting the immediate future. The ensemble of either musical performance or face-to-face talk depends on this bond of immediate temporal predictability (Scollon 1981: 342-3).

This emphasis on tempo as a "temporal bond" that unites ensembles during musical and social interaction echoes theories of social entrainment outlined in chapter 6. For instance, McGrath and Kelly (1986) argue that collective tempo is not a static or fixed state rather that it is a "negotiated temporal order", the outcome of the interactions among ensemble members. Viewed from this perspective, tempo is not a metronomically prescribed phenomenon; it is something that is shaped by and reflective of the expressive interactions of the individuals who make up the ensemble. Therefore, detailing the ways in which tempo fluctuates (or does not) in real time during music ensemble performance may act as an important marker of group interactions and group identity, and provide insights into the temporal processes that shape collective groove creation and aesthetics.

Tempo is of some importance in Cuban dance music as it can act as an important marker of style and tradition, and has a core relationship with timing and dance articulations. A Cuban trumpet player I spoke to in Vigo, Spain, reinforced this point. He recounted his experiences of performing with older *son* musicians in Villa Clara in the centre of Cuba:

> I'm going to tell you what some very good people with whom I played used to say, elder people, yes? They said that traditional Cuban music, the true traditional one, one has to play with the rhythm but when phrasing one has to play them a bit behind the rhythm. And not so, how to tell you, so modern, but a bit more tranquil, without rushing so much. I think that traditional son is played in that way. At least that is what I was taught (Jose Fernandez, interview[8.1], 22/2/10).

Jose Fernandez makes a clear connection between timing articulations ("one has to play them a bit behind the rhythm") and perceived tempo ("a bit more tranquil, without rushing so much"), and how these temporal considerations characterise more traditional *son* performance. A *rumbero* I spoke to in Havana made a very similar point. He placed more of an emphasis on the relationship between music and dance, and spoke of the interrelatedness between timing articulations and tempo, and stylistic conventions in popular Cuban dance music:

> Traditional son groups play behind. It is because of the tempo they have, the way they have of dancing son. Son takes you to that tempo [plays son clave slowly]. Actually, you have to be behind. Every music comes accompanied by dance and every dance has a style and music has to adapt to that style. If we are doing son the music cannot go in front, because then we are not doing son, we are doing timba, salsa, anything but son (Jesus Martinez, interview[8.2], 6/4/10).

Like Jose Fernandez, Jesus Martinez suggests that there is a fundamental relationship between timing ("you have to be behind"), the characteristic tempo of traditional *son* ("son takes you to that [slow] tempo") and dance ("every music comes accompanied by dance and every dance has a style and music has to adapt to that style"). The comments of Jose Fernandez and Jesus Martinez, coupled with the arguments of music scholars such as Scollon and Epstein and entrainment theorists like McGrath and Kelly, suggest that a careful examination of the ways in which group tempo varies during performance may reveal important aspects of the groove and aesthetics of Cuban dance music. These include the relationship between interactive timing and group tempo and how these aspects of temporality are shaped by the process of entrainment between instrumentalists, how temporality relates to notions of style and tradition, and the fundamental relationship between timing, tempo and dance.

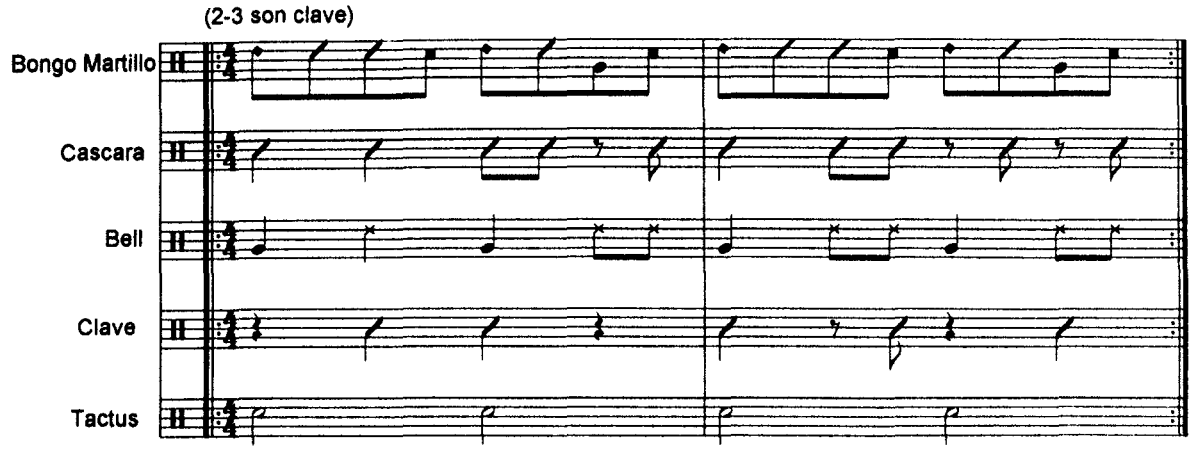
Therefore, the following discussion draws on timing data and ethnographic accounts in an attempt to tie together these perspectives to provide further insight into the role tempo might play in shaping the groove and aesthetics of *son* and salsa styles. Before considering ethnographic perspectives, the discussion now turns to the musical materials and methods used to measure performance tempo.

Musical Material and Methods

In order to maintain a level of consistency and to draw links between the micro-timing data presented in previous chapters, the following analysis of group tempo features the same three performances that were used for instantaneous tempo and phase analysis in chapters 6 and 7. However, group tempo was calculated over the entire length of the songs from which the earlier one-minute excerpts were taken. As before, three songs by three different groups were used, El Cuarto de Tula by Riamba, Muñeca by Havana Club Descarga and Habanera by Asere, which were broadly similar in duration, lasting 7m 43s, 7m 14s and 6m 48s respectively (see chapter 2 for more performance details).

The method used to calculate group tempo was very similar to that used for calculating instantaneous tempo in chapter 6. Firstly, beat one was marked in each bar. These onsets markers were taken from the bell pattern in each performance. The bell pattern was used as it fulfils the role of rhythm-section timekeeper and generally plays a consistent and stable pattern throughout and is, therefore, primarily responsible for establishing and maintaining performance tempo. However, when the bell was not being played – as, for example, in the opening *son* section (see the later discussion on the *son* to *montuno* transition) – an alternative timekeeping pattern played by the same instrumentalist was used. In the case of the *son* section in the Riamba performance, a version of the *cáscara* pattern played on the timbales was used and for the *son* sections in the Havana Club Descarga and Asere performances, the *martillo* pattern played on the *bongó* was used. As can be seen below in figure 8.1, the *cascara*, *martillo* and bell patterns clearly mark beat one in each bar.

Figure 8.1 – Tactus, Clave, Bell and Standard Cáscara and Martillo Patterns



(Adapted from Mauleón 1993: 201)

Secondly, the micro-timing data representing beat one in each bar was used to calculate the inter-onset intervals (IOIs) by subtracting each onset from the previous one. Thirdly, IOIs were then converted into beats per minute (bpm) by using the formula: 60 divided by the IOI. These calculations produced around 350 tempo markers, which resulted in an unclear presentation of tempo when graphed. To provide clearer tempo plots and to

examine overall temporal trends for each group, an average bpm representing each eight-bar section was calculated for each performance.

To facilitate a more detailed examination of temporal variation and to compare findings from the present study with those from extant studies, statistical measures were also used. To examine trends in overall tempo variability, percentage differences were calculated and to examine within-tune tempo variability the mean, standard deviation and coefficient variation were calculated using the raw bpm data. Percentages were calculated by dividing the difference in bpm across the entire tune by the initial tempo and multiplying the figure by 100. The coefficient of variation was calculated by dividing the standard deviation by the mean and then multiplying the result by 100 to produce a percentage. The coefficient of variation measures variability in relation to the mean and is a standard statistical measure used to compare the relative dispersion in one type of data with the relative dispersion in another type of data. In a more musical context, this measure has been used to determine temporal stability in jazz performance (Collier and Collier 1994) and in a range of other styles (Epstein 1985). The following sections make use of these quantitative measures to examine different aspects of group tempo. The discussion now turns to overall tempo variability, or the amount by which group tempo varies throughout the length of an entire performance.

Overall Tempo Variability

Figure 8.2a-c shows the average group tempo over each eight-bar segment, as marked by the timekeeper within the three groups. El Cuarto de Tula by Riamba was 7m 43s or 360 bars in length, Muñeca by Havana Club Descarga was 7m 14s or 359 bars in length and Habanera by Asere lasted for 6m 48s or 344 bars.

Figure 8.2a – Mean Tempo for Each Eight Bar Segment for Riamba Group

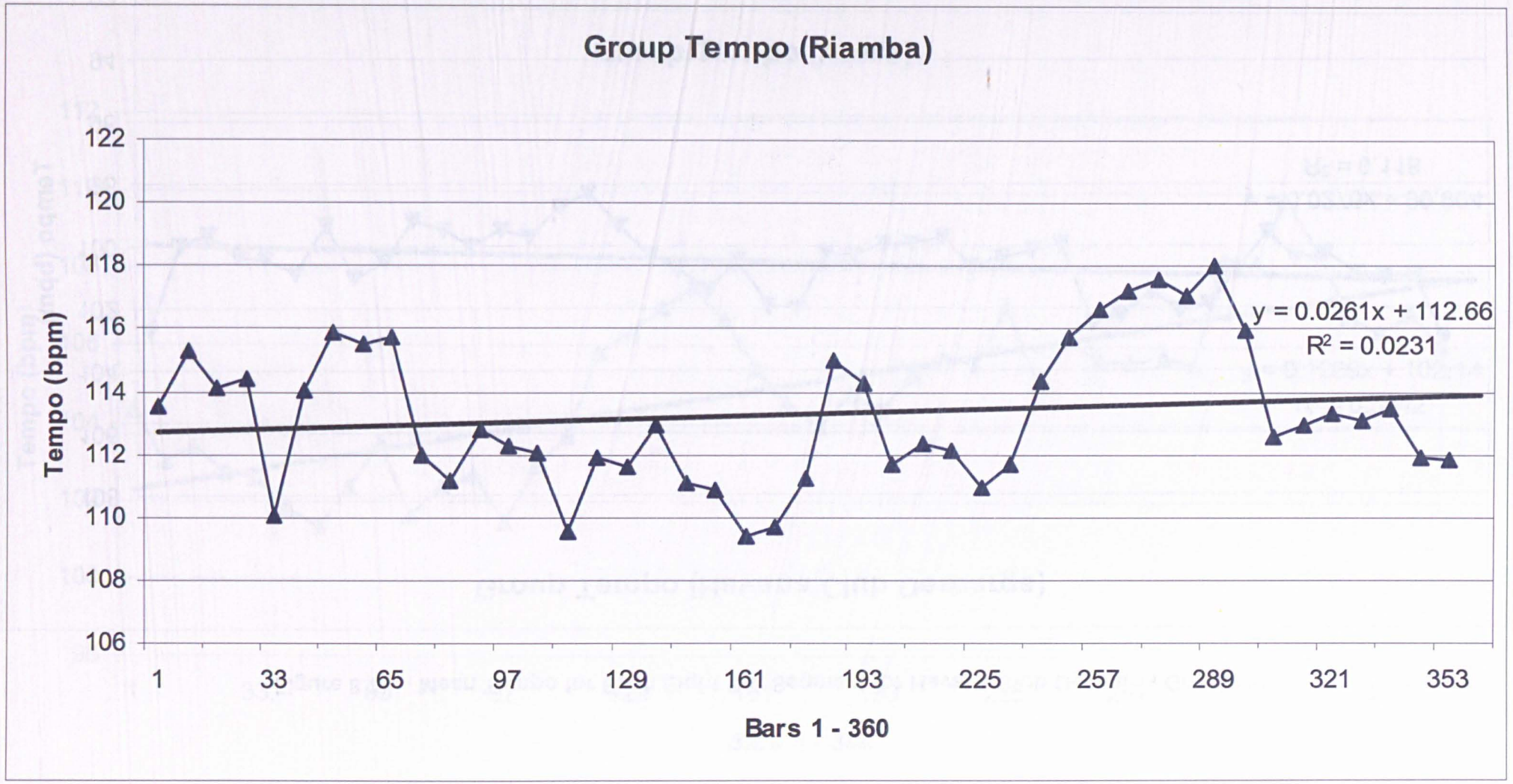


Figure 8.2b – Mean Tempo for Each Eight Bar Segment for Havana Club Descarga Group

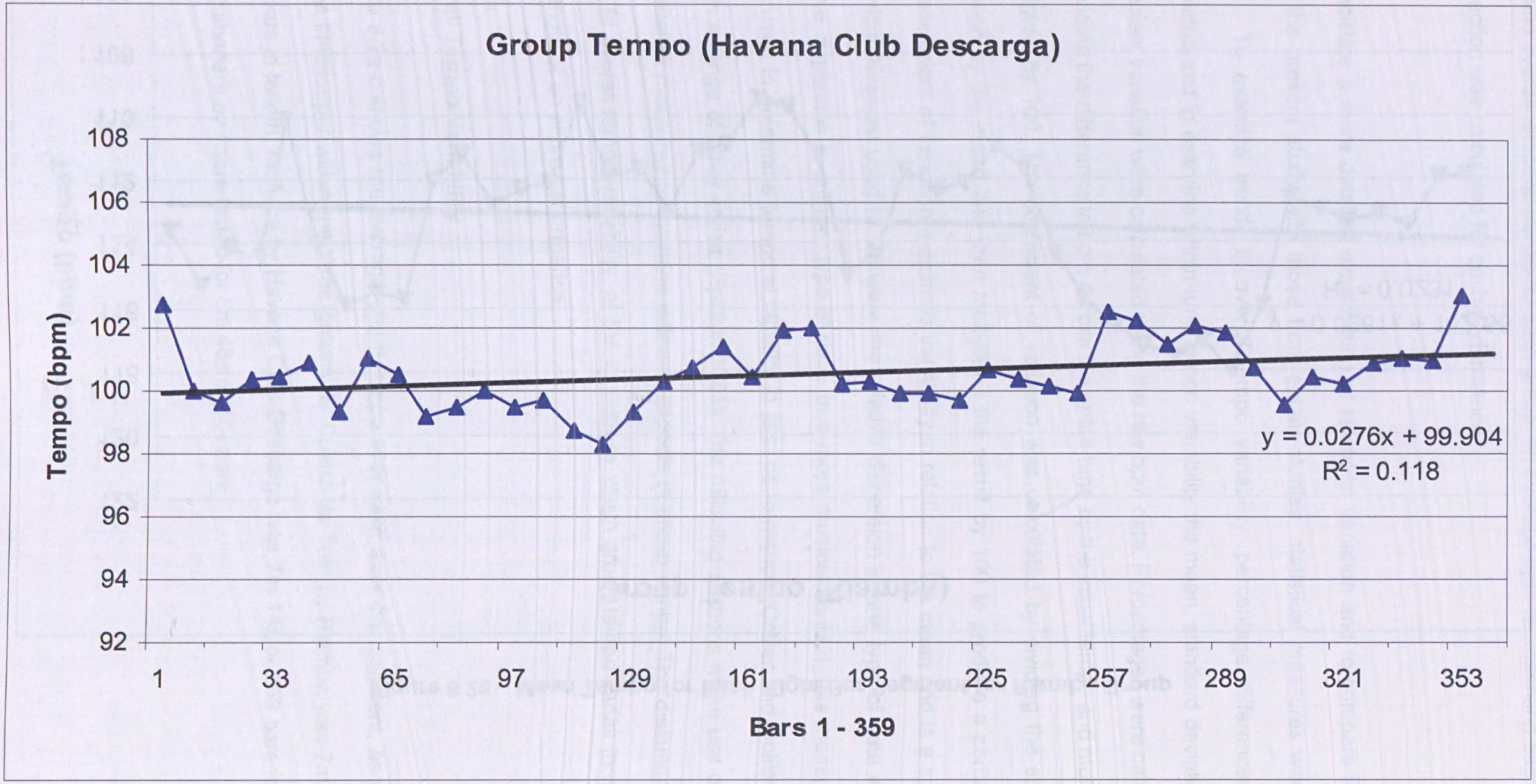
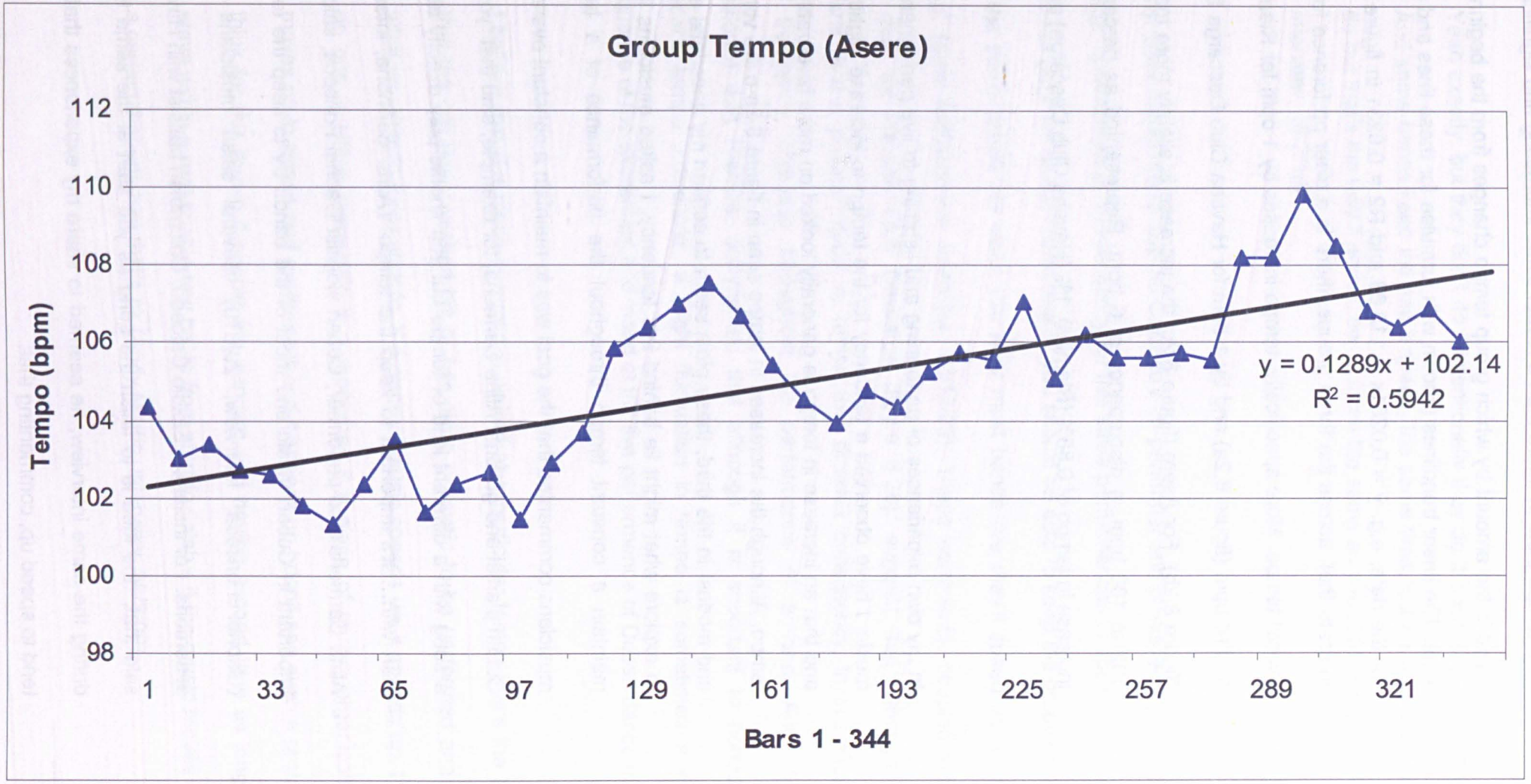


Figure 8.2c – Mean Tempo for Each Eight Bar Segment for Asere Group



The tempo plots in figure 8.2a-c reveal some interesting and significant trends. One such trend is the amount by which group tempo changes from the beginning to the end of the tune. The linear trendlines (shown with formulae for these lines and a measure of best fit for the data, e.g. y = 0.0261x + 112.66 and R2 = 0.0231 in figure 8.2a) in each graph indicate that, across the three groups, there is a clear preference for a slight increase in overall tempo. More specifically, tempo increases by 1 bpm for Riamba from around 113 to 114 bpm (figure 8.2a) and by 1 bpm for Havana Club Descarga from 100 to 101 bpm (figure 8.2b). For Asere (figure 8.2c) the increase is slightly more marked, changing from 102 to 108 bpm, a discrepancy of 6 bpm. Represented as percentages this gives an increase in tempo of 0.88% (Riamba), 1% (Havana Club Descarga) and 5.88% (Asere).

In my own experiences of performing and listening to live performances of Cuban dance music, I have observed a tendency for the tempo to increase slightly throughout a tune, and that an increase in tempo is generally looked on more favourably then a decrease in tempo. Although the increases in tempo seen in figure 8.2a-c are very small in two cases and modest in the third, these plots seem to confirm my anecdotal experiences. In order to explore what might lie behind this tendency, I asked musicians if it was important to maintain a constant tempo throughout the performance of a tune. Several Cuban musicians commented that the goal was to maintain a constant overall tempo throughout. Cuban pianist and guitarist Alina Carmona, for example, said that "you can create a song, a song with a different kind of tempo but you should play exactly at the tempo that you start with... it's important to keep the tempo" (Alina Carmona, interview, 20/8/10). And Alina Carmona's co-performer, Cuban violinist Gabriel Fonseca, said that "tempo is very important in Cuban music and most of the bands try to keep the tempo all of the time" (Gabriel Fonseca, interview, 20/810). Several salsa musicians made very similar assertions. For instance, Elpidio Caicedo, Columbian bassist with Havana Club Descarga, said that, "the idea is to finish the song as you start at the same the tempo" and later during the same interview, he seemed to share my experiences that many salsa groups tend to speed up, commenting that:

> Yeah exactly, but they don't do it intentionally they do it because, it just happens. And some bands keep the same speed, the same time, but it's a difficult thing to do but that's the way it should be, to finish the same as you start (Elpidio Caicedo, interview, 16/2/10).

Similarly, Sara McGuinness, Elpidio Caicedo's co-performer and pianist with Havana Club Descarga, commented on the tendency for live salsa performances to speed up: "slowing down is not good for dance music really...you should be able to keep the groove at pretty much the same tempo but when you hear most bands live they'll speed up as it gets exciting" (Sara McGuinness, interview, 23/12/09). These comments, coupled with the timing data for Havana Club Descarga (figure 8.2b), suggest that although salsa musicians hold a cultural model of tempo that dictates consistency, in live situations tempo frequently increases throughout the performance of a tune. Andy Martin, percussionist with Riamba, commented that although it is important to honour the composer's tempo indications, a slight fluctuation in tempo is sometimes a natural consequence of the excitement and mood of the live performance of Cuban dance music:

> I believe that if a piece of music is written at a particular tempo that's the tempo that the composer wished his or her piece of music to be performed and that's what you should try to stick to. If a piece of music speeds up, it speeds up. I mean no one is sitting there with a metronome...if a piece of music, organically if it moves on in tempo and excitement and it speeds up I don't see such a problem. I think for this music if people are dancing and having a good time as long as it stays within a reasonable few beats from start to finish...if the music moves within a certain amount then that's ok (Andy Martin, interview, 30/3/09).

Andy Martin's comment that performers should "stick to" the desired tempo of the composer reinforces the argument that musicians hold cultural models of the 'correct' tempo at which a particular tune should be ideally performed and that the goal is to adhere to that model during performance. In addition, his comment that "as long as it stays within a reasonable few beats from start to finish...I don't see such a problem" suggests that an increase in overall tempo is acceptable but only within certain boundaries. Studies of temporal variance offer some clues as to what these perceptual boundaries might be. For example, Epstein draws on psychological theories of auditory time perception (e.g. Weber's law) to conclude that a pulse would have to change by more than 5% over time periods of 0.4 to 2 seconds in order for that change to be perceptible (Epstein 1985: 41). Related studies of temporal variance in jazz suggest a 'just noticeable difference' (JND) of around 10% to 20% is required to be perceptible across a range of tempi (Friberg and Sundström 2002: 346; see also Collier and Collier (1994) and London (2004) for a broader discussion of perceptible thresholds in music).

According to JND thresholds, increases in tempi of 0.88%, 1% and 5.88%, as found in the current study, would be imperceptible, especially since the overall tempo variability seen in figure 8.2a-c occurs over much larger time spans (around 7 minutes) than in Epstein's experiments (0.4 to 2 seconds). Yet before dismissing the data above, it is worth noting two points. First, the information gathered in the study seems to support musicians' observations about Cuban dance music: namely, that performances have a slight tendency to increase in tempo (or, at the very least, they are more likely to stay at around the same tempo or speed up than to slow down in any significant way). Second, it is worth considering the applicability of JND theory to real-world performance situations. In the course of tempo analyses for this study, I have listened to these performance numerous times, and my perception is that the tempo increase in the Asere performance is detectable, whereas in the Riamba and Havana Club Descarga performances it is not. This suggests that around a 5% increase in tempo over a 7-minute time period is

noticeable by an experienced and culturally sensitive musician or listener. Furthermore, other musicians' comments suggest that they too are aware of such changes in tempo.

Perhaps this apparent disparity with JND research is a marker of the difference between perceptual thresholds that are largely derived from experimental/laboratory settings and performance and interview data that is taken from a much richer and more complex real-world setting. Of this disparity, Epstein writes that, "tempo filled with rich musical content and associations creates a different perceptual situation that may set discrimination limits that are different from the ca. 5% Weber fraction" (Epstein 1985: 41). It is likely that musicians' ears are more finely tuned to slight tempo changes in live performances due to many hours of attending, experiencing and entraining to small tempo shifts. Examining the precise perceptible thresholds of tempo variability detectable by listeners/musicians across time-periods of varying length would undoubtedly form the basis of an interesting and valuable further study of the relationship between changes in tempo, experience and perception. As a starting point for such a study, the above findings suggest that, using performances gathering in real-world settings, overall tempo variations of around 6 bpm (5%) or more across a 7-minute time period are in some cases perceptible by culturally sensitive listeners and performers of Cuban dance musics such as *son* and salsa. The following section examines another aspect of temporal variance: within-tune tempo variability.

Within-Tune Tempo Variability

Another important trend shown in figure 8.2a-c is that, within each group, tempo is not metronomic in nature but is in a constant state of fluctuation, continuously speeding up and slowing down throughout the performance of the tune. When comparing the levels of fluctuation between the three groups, initial inspection of these graphs indicates that within-tune tempo variability for the Havana Club Descarga group is perhaps less pronounced and therefore could be considered more temporally stable. To explore this

comparison further, it is instructive to consider the descriptive statistics for the three groups.

Table 8.1 – Descriptive Statistics for the Three Groups, Showing Within-Tune Tempo Variability

Group	Mean Tempo (bpm)	Standard Deviation (bpm)	Coefficient of Variation (%)
Riamba	113.25	2.92	2.58
Havana Club Descarga	100.52	2.32	2.31
Asere	104.97	2.65	2.52

Measures of standard deviation and coefficient of variation support the notion that within-tune tempo variability is less pronounced for the Havana Club Descarga performance. The SD figure for Havana Club Descarga is 2.32 with a coefficient variation of 2.31% and for Riamba the SD is 2.92 with coefficient variation of 2.58%. The same figures indicate that tempo variability for Asere falls between the Riamba and Havana Club Descarga performances with a SD of 2.65 and a coefficient of 2.52% (table 8.1).

It is worth reminding ourselves that when comparing relative levels of stability across the three groups the differences are very slight with coefficient of variation all below 3%. In Epstein's study of tempo variability in six different musical cultures, he found that the majority of temporal discrepancies fall below the 5% perceptual threshold, leading him to conclude that such discrepancies in performance are a natural consequence of the ebb and flow of live performance in real-world settings. He writes that:

> Beyond the fact that this music was improvised, the distractions of ceremonies, dances, social events would have precluded, if not disturbed, any thoughts the musicians might have about tempo *per se*, much less promotional relationships of tempo (Epstein 1985: 69).

Furthermore, Epstein suggests that tempo discrepancies in real-world live performances are influenced and constrained by aesthetic perceptions, judgements, intuitions, performers' emotional states and levels of enculturation: "what we might call 'received tempos' – part of the received knowledge of our repertoire and its traditions" (Epstein 1985: 70). Epstein's arguments have important implications for groove in Cuban dance music. They suggest that the coefficient tempo variations of less than 3% seen in table 8.1 are representative of and contribute to the characteristic groove and aesthetics of the live performance of *son* and salsa styles.

Relative levels of within-tune variability have also been shown to correlate to tempo itself. In Collier and Collier's extensive study of variance in jazz tempi, it was found that slow tempi yielded greater variability, or as the authors put it: "...slow songs are more variable than fast songs, because there is more room to vary" (Collier and Collier 1994: 225). However, in the current study the reverse is true: the slowest performance by Havana Club Descarga was least variable and the fastest performance by Riamba varied most. The reason for this disparity is unclear but maybe the result of several factors. Firstly, there is a difference in the styles of music under investigation: Cuban son/salsa in the current study versus jazz in the Collier and Collier study. Secondly, there is a relatively slight tempo difference between the performances under investigation in the present study, ranging from 100 and 113 bpm, versus Collier and Collier's more extensive, 90 to over 300 bpm (in some cases). The precise nature of the relationship between within-tune variability and tempo in Cuban music is unclear and it would require the examination of a more extensive range of performance tempi to understand fully.

Taken together, measures of overall and within-tune variability, coupled with musicians' comments suggest that although tempo may fluctuate during the performance of a tune, the degree of fluctuation is not random. It is more the case that these fluctuations fall within certain quantifiable and ordered boundaries. Moreover, the findings presented here

indicate that these temporal fluctuations may also be reflective of and contribute to the aesthetic aspects of real-world performances, adding excitement and energy to the collective groove of *son* and salsa. The forthcoming discussion examines in more detail where and why tempo fluctuations might occur and what affect they might have on the groove and aesthetics of *son* and salsa performance.

Performance Structure and Tempo: The Son to Montuno Transition

Many scholars concerned with exploring expressive timing variations have drawn connections between changes in performance tempo and the structural properties of music: for example, Gabrielsson (1988) and Palmer (1989) in the performance of Western classical music; Berliner (1997), Butterfield (2010) and Collier and Collier (1994) in jazz contexts; Brinner (1995) in Javanese gamelan; and Maduell and Wing (2007) in ensemble flamenco performance. Of the relationship between performance structure and tempo in jazz, Butterfield writes that "tempo shifts tend to be minute, rarely exceeding five percent, and tend to occur only at major structural junctures, such as the 'bridge' in an AABA form" (Butterfield 2010: 168). And in Western classical performance, Gabrielsson argues that by the use of "appropriate variations of the tempo the performer can contribute to make the structural subdivisions clear to the listener: where a new motive, a new phrase, a new period, etc., begins, and where each ends" (Gabrielsson 1988: 34).

In Cuban musical contexts, the binary *son-montuno* performance structure is pervasive. Important and influential styles such as *rumba*, *danzón*, *son* and salsa all feature an initial song-like opening section that places more of an emphasis on melody, harmony and lyrics, followed by the *montuno* section that features call-and-response singing and where the emphasis shifts to improvisation over cyclical rhythmic-harmonic ostinati. The structural transition from *son* to *montuno* is of some importance for an examination of groove because it is often characterised by a perceived increase in dynamic, excitement and group tempo by many scholars of Cuban music (see chapter 1). Therefore, the aim of

this section is to examine changes in tempo between the *son* and *montuno* sections and to explore some of the important dynamical, aesthetic and emotional aspects associated with these temporal changes. Furthermore, the relationship between tempo changes at *son* and *montuno* sections and groove will also be explored.

Figure 8.3a-c shows the same tempo plots for the three groups seen earlier, with the addition of a vertical dotted line marking the *son* to *montuno* transition point and, to provide a more detailed view of tempo variability, polynomial trendlines (with associated formulae) replace the linear trendlines.

The polynomial trendlines show that, whilst each group has a slightly different tempo profile, there are some significant similarities between them. Firstly, the *son* sections are characterised by a slight decrease in tempo by around 2 bpm for each group. Secondly, throughout the *montuno* sections, the tempo fluctuates between 3 to 5 bpm and, particularly in the case of the Havana Club Descarga and Asere performances (figure 8.3b-c), the tempo shows a steady but slight increase of around 3 bpm. For Riamba (figure 8.3a) this increase in tempo in the *montuno* is less obvious. The trend in this performance is characterised by a continued decrease at the beginning of the *montuno* section before starting to increase at around bar 169. Thirdly, despite tempo changes throughout the *son* and *montuno* sections, the performances end within 2 or 3 bpm of the start tempo. Once again, descriptive statistics are useful when quantifying the precise amount by which the tempo changes.

Figure 8.3a – Mean Tempo for Each Eight Bar Segment for Riamba Group: Son to Montuno Transition

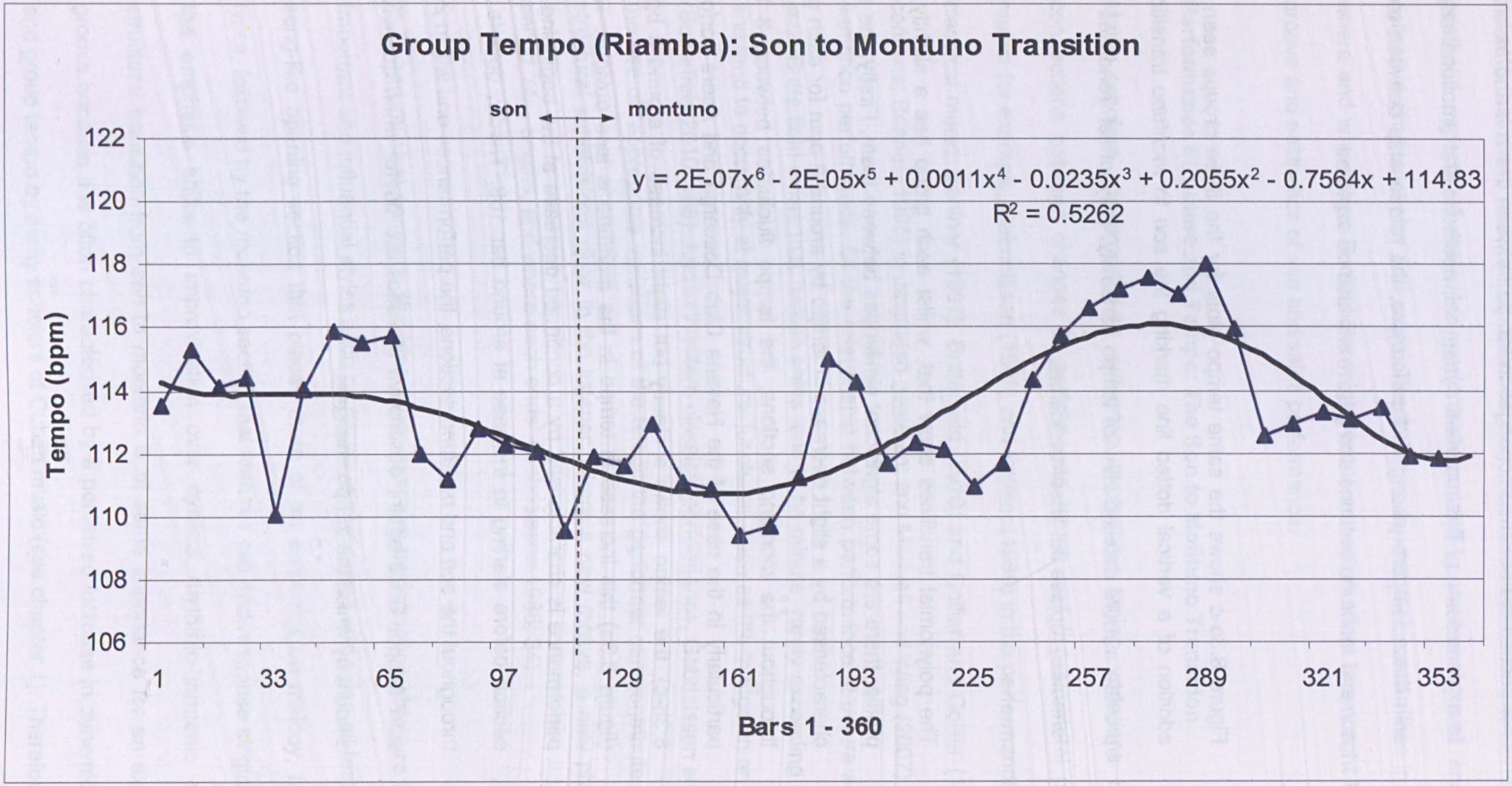


Figure 8.3b – Mean Tempo for Each Eight Bar Segment for Havana Club Descarga Group: Son to Montuno Transition

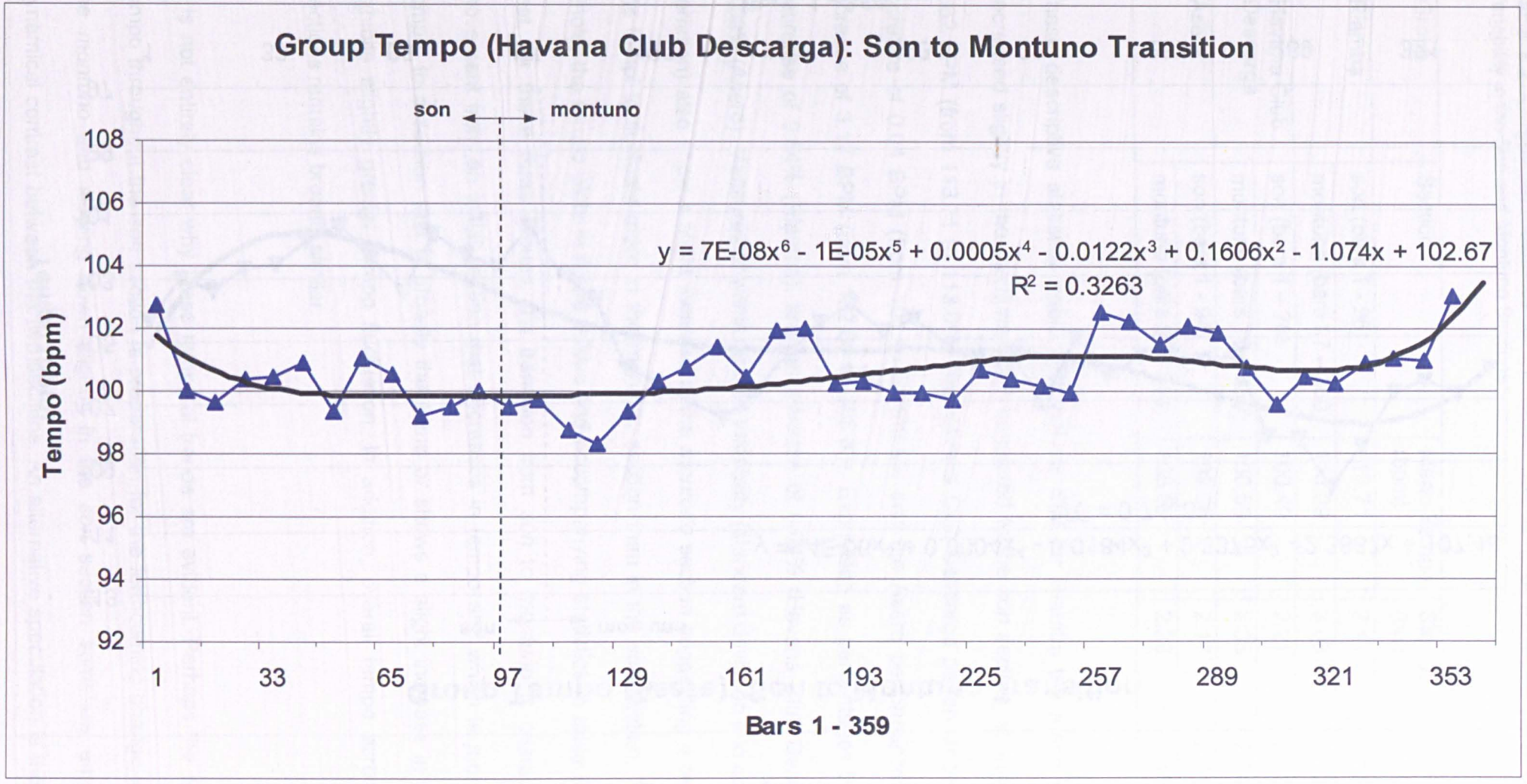


Figure 8.3c – Mean Tempo for Each Eight Bar Segment for Asere Group: Son to Montuno Transition

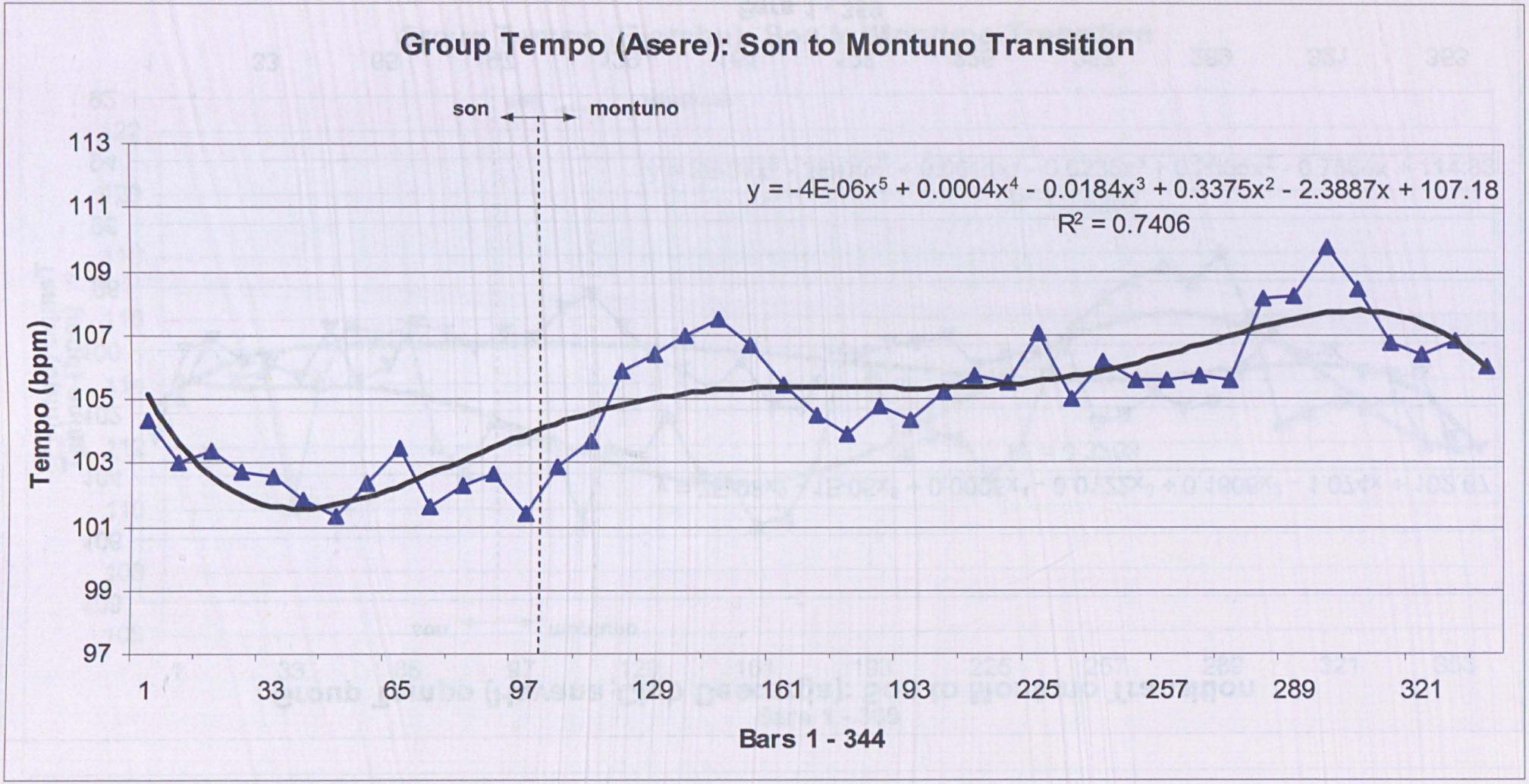


Table 8.2 – Descriptive Statistics for the Three Groups, Showing Mean Tempo and Tempo Variability in the Son and Montuno Sections

Group	Section	Mean Tempo (bpm)	Std. Dev. (bpm)	Coefficient of Variation (%)
Riamba	son (bars 1 - 96)	113.71	2.41	2.12
	montuno (bars 97 – 360)	113.09	3.08	2.72
Havana Club Descarga	son (bars 1 – 78)	100.49	2.21	2.20
	montuno (bars 79 – 359)	100.53	2.35	2.34
Asere	son (bars 1 - 94)	102.66	2.17	2.11
	montuno (bars 95 - 344)	105.83	2.28	2.15

These descriptive statistics (table 8.2) indicate that for Riamba the mean tempo has decreased slightly in the *montuno* when compared to the *son* section, slowing down by 0.62 BPM (from 113.71 to 113.09). The Havana Club Descarga performance shows an increase of 0.04 BPM (from 100.49 to 100.53) and the Asere performance shows an increase of 3.17 BPM (from 102.66 to 105.83). Expressed as percentages this gives a decrease of 0.54% (Riamba), and an increase of 0.04% (Havana Club Descarga) and 3.09% (Asere). Measures of within-section variability (standard deviation and coefficient of variation) also show a slight increase in the *montuno* section suggesting a tendency for the tempi to fluctuate more in the *montuno* section than in the *son* section. Taken as a whole, the tempo plots in figure 8.3a-c and accompanying statistics in table 8.2 suggest that, for these three groups, the transition from *son* to *montuno* is characterised by movement from an initial section that decreases in tempo and which is more stable in tempo, to a section that is broadly the same or shows a slight increase in tempo and exhibits slightly greater tempo fluctuation. In addition, overall tempo across the two sections remains broadly similar.

It is not entirely clear why these temporal trends are evident. Perhaps the decrease in tempo throughout the *son* section is preparation for the forthcoming change in tempo at the *montuno* and slowing down slightly in the *son* section somehow enhances the dynamical contrast between the two sections. An alternative speculation is that this is an

example of what some researchers have termed "tempo compensation", a phenomenon whereby changes in different parts tend to "compensate mutually" leading to some sections of a tune being played more slowly to compensate for faster sections in order to "maintain the same total performance time as in earlier performances" (Gabrielsson 1999: 542). Whether tempo compensation, a theory derived from the timing studies of Western classical performances, is wholly applicable to Cuban dance music would need to be determined through a detailed investigation as part of a separate study. The data presented here does however suggest that this phenomenon may be evident.

It is also worth highlighting that the level of variability in tempo between the two sections is very slight: around 3% or less in most instances. When this 3% or less discrepancy is viewed through the lens of auditory perception theories that were outlined earlier (Weber's law and JND) it falls below the 5%-10% perceptual threshold. Therefore, according to these theories, the changes in tempo discovered here would be imperceptible to the listener. In order to determine if, in Cuban musical contexts, this actually is the case, it is informative to consider ethnographic data. Sara McGuinness, English pianist with Havana Club Descarga, explained how, in salsa contexts, musicians are acutely aware of slight changes in tempo at the *montuno*:

> What tends to happen in salsa bands is, when you get to the montuno section it speeds up. I've heard people have debates about whether it should speed up or not. Sometimes it does, it will naturally speed up when the campana comes in because it gets more exciting (Sara McGuinness, interview, 23/12/09).

Vicente Areucibia, percussionist with Cuban group Asere, made a similar point, stating that in many Cuban dance genres there is a perceivable increase in tempo at the *montuno*

section. He spoke of the characteristic contrast in 'aire'[17] between the *son* and *montuno* sections:

> There are certain music genres in which yes, the time changes...rumba starts with an 'aire', and then it accelerates a bit. There are *sones* that start with an 'aire' and then accelerate a bit, they are called bolero-cha, bolero-son, bolero-rumba, they start slowly and then change into a different timing. Above all, in Cuban music you can see that a lot. It's very difficult to play a montuno starting [sings montuno slowly] because the very spirit makes you ahh [conveys a sense of increased excitement] (Vicente Areucibia, interview[8.3], 23/7/10).

Juan Alarcon, Vicente Areucibia's fellow percussionist in Asere, described the 'aire' of the *montuno* as 'happier' when compared to the *son* section: "it's happier therefore sometimes it [the tempo] goes a bit to the front of the song. Everything is in the tune's energy and the musicians" (Juan Alarcon, interview[8.4], 23/7/10).

The comments of Sara McGuinness, Vicente Areucibia and Juan Alarcon, coupled with the above timing data of their performances, underscore some important aspects of tempo in Cuban dance music. Firstly, these findings suggest that there is sometimes a slight but characteristic increase in tempo when moving from the *son* to the *montuno* sections in many Cuban dance musics. Secondly, this slight increase in tempo of 3% or less throughout the *montuno* section is perceptible by Cuban musicians and therefore the thresholds of 5% to 10% proposed by auditory perception theorists may not be entirely applicable to the performance of Cuban dance music. However, this point is speculative and requires clarification through further investigation. Such an investigation would need to consider timing and ethnographic data taken from a greater number of real-world

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[17] *Aire* literally means 'air' but is a term often used by Cuban musicians to refer loosely to the combination of tempo, rhythmic cells and other rhythmic features that characterise musical genres

performances in order to determine if the findings proposed here hold for a range of *son* and salsa performances. Thirdly, there is a correlation between the temporal characteristics of the *montuno* (a perceived increased and variability of tempo) and the emotional characteristics of the music, as suggested by phrases such as "the very spirit makes you ahh" and "it's happier". Fourthly, there is an important correlation between the temporal characteristics of the *montuno* section and the groove and aesthetic qualities of the music (e.g. energy and sense of excitement) or as Sara McGuiness put it: "it will naturally speed up when the campana comes in because it gets more exciting".

As Sara McGuinness' comment suggests, in modern *son* and salsa contexts, one instrument is primarily responsible for marking the transition from *son* to *montuno*: the *campana* or bell. At this structural transition, the *bongosero* typically switches to playing bell at the start of the *montuno* in order to increase the dynamic, as Vicente Areucibia explained:

> The responsibility for the tempo to become tasty in the montuno part is this one here [points to fellow percussionist Juan Alarcon]. He starts playing his bongó normally, and then he puts it down, takes the campana and normally there is a call [sings campana break], it's a preparation to warn that something is coming, like the train (Vicente Areucibia, interview[8.5], 23/7/10).

Vicente Areucibia's "like the train" metaphor suggests a sense of forward motion is associated with the instrumental change from *bongó* to *campana* at the *montuno*. Perspectives of groove presented in previous chapters suggest that this motional sensation is evoked by two main inter-related factors. First, when switching from *bongó* to *campana*, the instrumentalist moves from playing a freer more improvised pattern on the

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(Robbins 1989: 386).

bongó to playing a more repetitive and tactus-defining pattern on the *campana*. As detailed in chapter 5, continuous marking of the tactus on the bell supports and enhances many of the syncopated rhythmic and harmonic anticipatory effects that help to create a sense of tension and release and forward momentum in Cuban dance grooves. Second, when playing bell in the montuno section, the instrumentalist is required to 'drive' (in salsa parlance) the music forward. This sense of drive may be created by the bell playing in front of the beat (as was the case seen in the phase analysis of the Riamba excerpt in chapter 7), or as the above timing and ethnographic data indicates, by a gradual and slight increase in tempo and temporal fluctuation throughout the *montuno*. It is highly likely, however, that the perceived dynamic, drive and forward motion in the groove of *son* and salsa styles is produced by a combination of these inter-related and characteristic musical phenomena.

Tempo and Dance

The reason why a sense of motion and heightened dynamic at the *montuno* is such a crucial feature of the groove of many Cuban dance styles is evident from the following quote from veteran and virtuoso Cuban bassist Carlos Del Puerto. As with all musicians interviewed for this study, I asked him if it was important to maintain a consistent tempo during a performance. He replied that:

> In my long career as a bass player and having played every genre of popular music, I have always believed that it is more important to maintain the sabor of the tune, the feeling or swing, than a metronomic tempo. In many of the Cuban dance genres such as guaracha, son, etc, sometimes it is necessary to speed up the tempo a bit from the montuno, to give more power and passion to the dancers (Carlos Del Puerto, interview[8.6], 18/6/10).

Carlos Del Puerto's insightful and well-informed comments directly link the temporal, aesthetic, emotional and motional aspects of Cuban *montuno* grooves to dance. These interrelated aspects of groove "give more power and passion to the dancers", as he puts it. Similarly, Cuban pianist and guitarist, Alina Carmona suggested that the temporal features of the *montuno* were integral to producing a groove that invites participation through dance. She said that:

> It's part of the characteristic of the music, that you are starting a tempo that could be a little bit more slow and once you start with the montuno, that is the bit that is inviting to dance, then that goes fast (Alina Carmona, interview, 20/8/10).

Providing a slightly different perspective on the connection between different dance grooves in the *son* and *montuno* sections, Michel Salazar, bassist with Asere, said that an increase in tempo at the *montuno* was directly related to specific dance choreographies:

> It's for more excitement. It's for the dancers because in the body of the song they dance a different way with their partners, with the lady. In the montuno they split the dancers and make another step (Michel Salazar, interview, 23/7/10).

Exploring this perspective further would clearly require specialist knowledge of the choreographies associated with particular musical styles, which is not the focus of the current study. However, Michel Salazar's comments serve as a reminder of the symbiotic connection between dance, the *son-montuno* performance structure, and the aesthetic and emotional qualities of groove in much of Cuban dance music, a connection that will be examined further in the next chapter.

To summarise the main points made in this section and the preceding one, the contrasting temporal characteristics of the *son* and *montuno* sections, and the associated dynamical and emotional-motional aesthetics, appear to be an important and pervasive performance model within Cuban and Cuban-related dance musics. The *son* section is characterised by a slightly slower, more stable tempo while the *montuno* is characterised by a moderately faster tempo with greater temporal variation. Although the temporal contrast between the sections is very slight (3% or less) musicians appear to be aware of this contrast and of the significance it holds within Cuban musical culture. The sense of dynamic, excitement and forward motion of the *montuno* groove is initiated by the *bongosero* when switching to the bell and by playing the associated tactus-defining pattern. A steady but slight increase in tempo throughout the *montuno* helps to evoke, generate and maintain a sense of motion and excitement in the groove, sensations that seem to play a crucial role in inviting participation through dance.

Synchronisation and Entrainment

In order to understand fully the relationship between groove, performance aesthetics and group tempo in Cuban dance music, it is instructive to reconsider theories of synchronisation and entrainment that were outlined at the beginning of chapter 6. Socio-cultural entrainment theorists such as Condon (1986) and Hall (1989) argue that entrainment or synchronous rhythmic interaction is a key process in the development of a "shared temporal order", a temporal order born from the rhythmic, dynamic and interactive behaviours of participants within the group. Similarly, McGrath and Kelly's (1986) social entrainment model proposes that, within a social system, participants' interactive rhythmic behaviours "mesh" via a process of mutual entrainment resulting in a "negotiated temporal order" or dynamic collective "tempo".

Only a handful of extant timing studies have made explicit connections between synchronisation, entrainment and group tempo in musical performance (e.g. Doffman 2008; Keller 2008; Lucas et al 2011). In his examination of joint action in music performance, for example, Keller draws on social cognition theory to argue that group tempo is the result of the interactive, rhythmic and synchronous behaviours of the participants that comprise the ensemble:

> The most fundamental requirement of performance-based musical joint action is the temporal coordination of one's own movements and sounds with those of others. To satisfy this requirement, individuals must constantly adjust the timing of their movements in order to maintain synchrony in the face of expressively motivated deviations in local tempo (rubato), large-scale tempo changes, and other – often unpredictable – events (Keller 2008: 212).

Keller also argues that entrainment, active participation and intersubjectivity are fundamental to effective musical joint action and to the development of a cohesive ensemble sound:

> In musical ensembles, performers engage in mutually coupled, affective exchanges that are mediated by instrumental sounds and expressive body gestures. Ideally, the entrainment underlying such activity should not only result in the coordination of sounds and movements, but also of mental states. Thus, in accordance with enactive approaches to social cognition, performers intentionally and actively participate in making sense of the music so that its 'meaning' is shared among co-performers and communicated to audience members. This interactive form of enaction requires each performer to be sensitive to the subjective states expressed by his or her co-performers. Musical joint action

therefore exercises the human predisposition for intersubjectivity (Keller 2008: 206).

The arguments presented by these theorists suggest that in musical and social ensemble situations group tempo is a shared phenomenon, shaped by entrainment, intersubjectively shared thought processes and the synchronous rhythmic behaviours of ensemble members. The aim of the following discussion is therefore to discover if similar socio-musical processes and entrainment behaviours shape group tempo in Cuban music performance, and to examine the role these interactive behaviours play in collective groove production.

In order to do this, three sets of timing data (instantaneous tempo, phase relationships and group tempo) taken from this and previous chapters will be reconsidered, along with ethnographic accounts of performers' experiences. Of the three groups studied previously, the performance by Cuban group Asere shows a more marked change in instantaneous and group tempo, and therefore provides an obvious opportunity to examine how musicians might engage in synchronous and entrained musical joint action. Figure 8.4a illustrates group tempo for the entire Asere performance and figures 8.4b-c show instantaneous tempo and relative phase for the bell, bass and guitar (the same 1m 6s excerpt that featured in chapters 6 and 7). As indicated by the boxed area in figure 8.4a, this excerpt occurs towards the end of the performance in the latter half of the *montuno* section, between bars 241 to 297.

Figure 8.4a – Group Tempo for the Entire Asere Performance

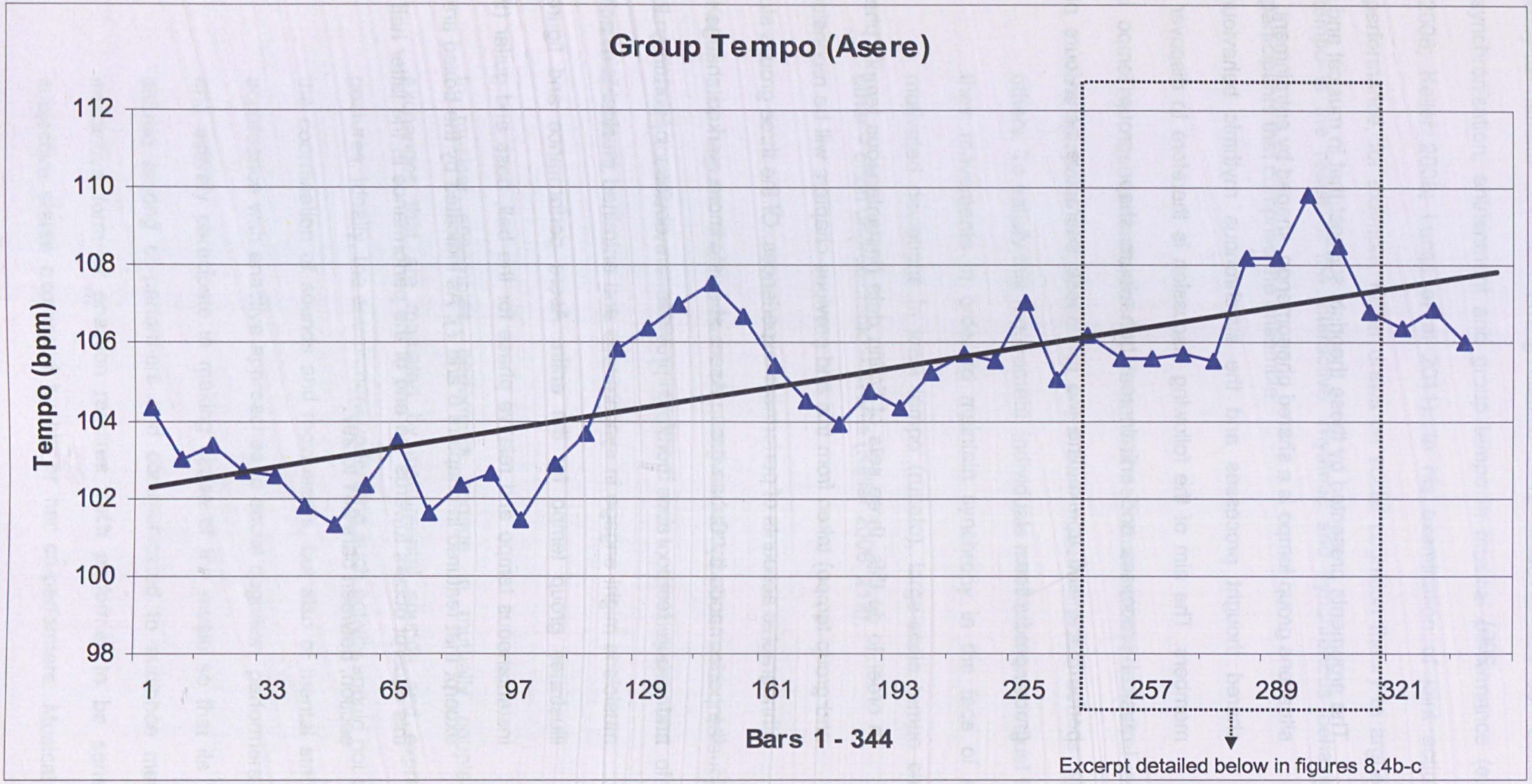


Figure 8.4b – Instantaneous Tempo for the Asere Excerpt

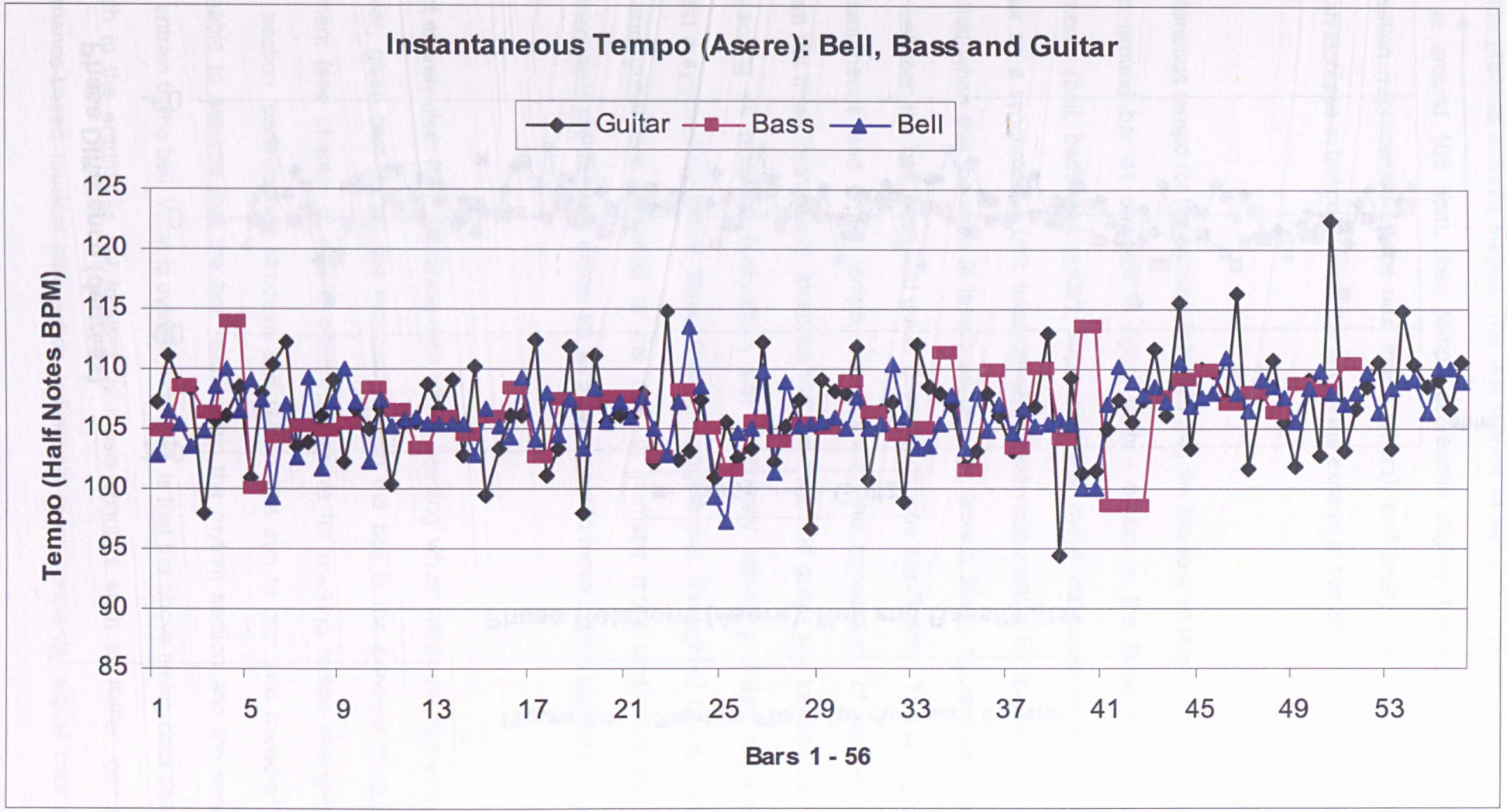
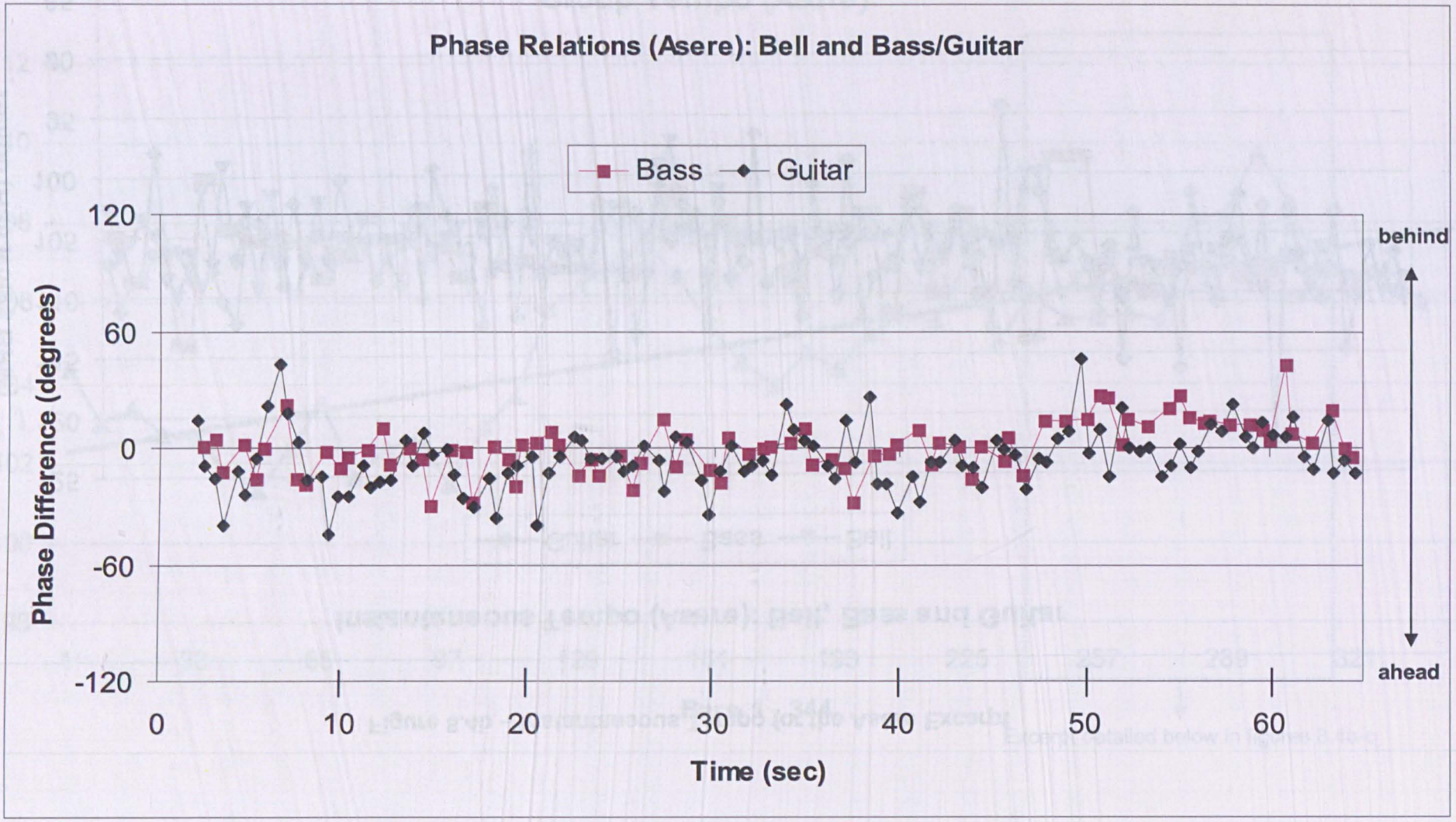


Figure 8.4c – Relative Phase for the Asere Excerpt



Examination of group tempo (figure 8.4a) between bars 241 and 297 shows that changes in tempo proceed in three stages. The first marker at bar 241 indicates that the tempo starts at around 106 bpm, then tempo decreases slightly followed by a period of stabilisation (represented by the next four markers), and finally the next three markers show an increase in tempo towards the end of the excerpt at bar 297, to around 110 bpm.

Instantaneous tempo for the excerpt indicates that the increase in tempo towards the end – from around bar 41 onwards in figure 8.4b – occurs in the three rhythm section instruments (bell, bass and guitar), suggesting that these instrumentalists are shifting together as a synchronous unit. Interestingly, phase relationships for the same excerpts show that when this increase in tempo occurs – at around 50s in figure 8.4c – relative phase between the bell, bass and guitar does not change significantly. This changeability in instantaneous and group tempo, coupled with the consistency of relative phase between the three instruments, indicates that the bass and guitar are 'locked in' with the bell, tracking its temporal fluctuations and continually adjusting phase alignment to maintain a synchronous state. These findings suggest that, throughout this excerpt, the bass and guitar are entrained to the bell, or perhaps more accurately the three instrumentalists are mutually entrained, as they appear to move in time together.

It is not entirely clear from the timing data who is 'leading' whom within the rhythm section. However, given that during the *montuno* section the bell is the principal timekeeping instrument (see chapter 6) and is often responsible for marking tempo changes (see above section 'performance structure and tempo: the *son* to *montuno* transition') it is reasonable to assume that the bell leads within the rhythm section and the bass and guitar entrain to the bell. What is evident, however, is that the above timing data does add strength to the arguments put forward by music scholars such as Keller: namely, in performance-based musical joint action individuals must constantly adjust their timing

behaviours to maintain synchrony in the face of expressive temporal changes and that entrainment is a key process that helps musicians to maintain this level of synchronicity.

Whilst macro- and micro-timing data provides an important empirical dimension, ethnographic data allows connections to be drawn between musicians' verbalisations and the more socio-musical dimension of entrainment, groove production and group tempo. During interviews, many musicians spoke in terms that suggested group tempo was an ensemble phenomenon born from the synchronous interactions, feelings and articulations of group members. When talking of the perceived increase in group tempo at the *montuno,* Asere's percussionist Vicente Areucibia, added the caveat that "if everyone does that together, it's alright, but if [not] then there's a problem" (Vicente Areucibia, interview[8.7], 23/7/10). Like Vicente Areucibia, other Cuban musicians also spoke of tempo change at the *montuno* in collectivist terms. Pianist and guitarist Alina Carmona said that:

> While you are playing the first bit [son] you must keep this tempo slow and then the montuno, more ahead but everybody has to give the new tempo. You can change the tempo...this kind of music is asking for this kind of tempo, more slowly or more fast. But everybody at the same time (Alina Carmona, interview, 20/8/10).

These comments correlate with the timing data, in that they suggest group tempo is not solely the responsibility of principal timekeeping instruments, such as the bell, but rather that tempo is more of a group phenomenon, the product of the synchronous and mutually entrained behaviours of ensemble members. Cuban *sonero*, Jesus Bello, made a related point and highlighted the relationship between group tempo and interactive groove production:

> There is a characteristic of the music that it's very exciting and when you are in a gig and all the interaction going on with the audience and between the musicians quite often you speed up but it's not necessary to speed up to have swing. And a professional Cuban group who plays something exactly the same tempo with all the mambos and all the percussion solos and everything, has a fantastic swing without speeding up (Jesus Bello, interview, 11/8/09).

Jesus Bello's comments are pertinent. Firstly, his comment that "in a gig and all the interaction going on with the audience and between the musicians quite often you speed up" suggests that tempo is not merely the result of an unwavering or static synchronous relationship between participants, but it is the result of dynamic group (and group-audience) interaction. Secondly, his observation that the music can have "fantastic swing without speeding up" suggests that the socio-musical processes that shape collective groove production, as well as the "characteristic" increase in tempo, can jointly add a sense of excitement to live performance. Spanish salsa singer, Graciela Rodriguez, also spoke of the relationship between tempo and the interactive process of ensemble groove creation, musing that:

> It [tempo] depends on the energy of the place; it depends on the energy of the band and how they are feeling. If the groove is right and you can keep the meaning of the song in place it shouldn't speed up. There is no need to speed up but when you speak about Cuban music you can't think of the metronomic speed as well. I think it's all a question of giving and taking, keeping up with the groove, how it's coming, you should never think of metronomic speed in Cuban music (Graciela Rodriguez, interview, 7/1/10).

Graciela Rodriguez's comments paint an even more complex picture of tempo, one that is influenced by an array of inter-related factors: first, the performance space ("the energy of

the place") that the group shares with the audience; second, the individual thoughts, feelings and articulations of the group members ("the energy of the band and how they are feeling"); third, the "meaning of the song" being performed; and, fourth, the real-time interactions and negotiations ("giving and taking") within the group as they collectively seek to create a groove with the desired aesthetic.

However, the most striking example of the complex relationship between tempo and the real-time interactions, and the thoughts, feelings and perceptions of musicians is demonstrated by the following quote, taken from an interview with Andy Martin, Riamba's percussionist. Here he recounts the experience of a mild disagreement between himself and another percussionist while negotiating a groove with the 'correct' tempo during a performance:

> I think it does help to feel and think the same...I have had experiences myself where I've been playing with another rhythm instrument and I'm trying to sit back on the beat and I know this other person is trying to force the issue and, yeah, let's get going, let's push it on and I guess we're at a disagreement as to how the music should go. You know, should we sit back, should we push it forward and then rather than it being about the music it becomes about a battle of wills...is that person going to give in to me or am I going to just give in to them and say ok, whatever, you know. If you want to go faster, we'll go faster, I don't agree with you...it's one of those things...in a moment of a performance, you know, it's nothing do to with friendship or anything like that, it's just quite simply an agreement or disagreement on stage as to should we or shouldn't we push or pull the tempo. That's the problem that you get...where one person wants to speed and another person is trying to deliberately hold it back...so as long as you are doing it together...I don't see such a problem (Andy Martin, interview, 30/3/09).

Aside from providing an interesting performance anecdote, one most experienced musicians will probably identify with, Andy Martin's comments underscore many of the themes developed throughout this and previous chapters. First, the core relationship between rhythm section timing ('pushing and pulling') and group tempo, second, the importance of real-time socio-musical interaction and negotiation in producing that collective sense of tempo, and third, the interpersonal and intersubjective nature of the interactive timing relationships that underlie collective-effective groove production – as Andy Martin remarks: "I think it does help to feel and think the same".

The above ethnographic accounts presented here, coupled with the macro- and micro-timing data, strongly suggest that socio-musical entrainment is a key process that underlies synchronous ensemble behaviour and helps to 'lock' rhythm section musicians together when negotiating group tempo. Furthermore, these findings suggest that the same socio-musical entrainment processes that underlie the production of group tempo also play an important role in shaping other important dimensions of ensemble musicality: the collective groove, energy and aesthetics of *son* and salsa live performance. Finally, many of the musicians cited above use language that points to the emotional character of the intersubjective interactions that shape collective-effective groove production and aesthetics. For instance, Jesus Bello speaks of the increased levels of excitement during effective live performance and Graciela Rodriguez speaks of how groove is reflective of the energy and feelings of participants. And when Andy Martin is describing his onstage disagreement whilst negotiating group tempo his use of terms like "it becomes about a battle of wills" suggest that these are emotionally charged musical experiences. The emotional nature of groove production forms the basis of the discussions in the following chapter.

To summarise the findings in this chapter, profiles of overall tempo variability indicate that although musicians hold cultural models of the ideal tempo for a particular tune, during

live performance there is a tendency for the tempo to increase slightly by 1 to 6 bpm or by 0.88 to 5.88%. The analysis of the small sample of real-world performances presented here, alongside the reported experiences of musicians, suggest that an increase in overall tempo of around 6 bpm (5%) or more across a 7-minute time period is perceptible by culturally sensitive listeners and performers of *son* and salsa. The examination of within-tune temporal variability suggests that groove production in *son* and salsa styles is characterised by a less than 3% coefficient of variation, with performance tempi of 100 to 113 bpm. Findings from ethnographic and timing data suggest that these temporal features have important aesthetic considerations, adding a perceived excitement and energy to the collective groove.

The investigation of tempo changes within the pervasive *son-montuno* performance structure adds another dimension to these aesthetic considerations. When the *bongosero* marks the beginning of the *montuno* section by playing the continuous tactus-defining pattern on the bell, the instrumentalist enhances the tension-and-release dynamic within the rhythmic-harmonic framework, and reinforces the sense of forward motion and energy in the groove. Moreover, the dynamics associated with the *montuno* groove are closely related to dance and appear to play a crucial role in evoking participatory dance behaviours.

Another crucial component that helps to shape group tempo and the collective groove in the *montuno* section is the dynamical and synchronous behaviours of ensemble members. Socio-musical entrainment processes appear to be central in maintaining and guiding synchronous ensemble action. These processes, which are played out in real time within the rhythm section, add an additional layer of excitement, drive and energy to the collective groove and are influenced by a range of inter-related factors such as the performance space, audience participation, the song being performed and the

interpersonal and intersubjective thoughts, feelings and perceptions of participating individuals.

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Chapter 9

The Experience and Feel of Groove

Discussions in previous chapters have focussed on the rhythmic-harmonic features, interactive timing processes, musical sensibilities and aesthetics that underpin the creation of an effective groove in Cuban music performance. The purpose of this chapter is to build on these discussions to consider the ways in which performers of Cuban dance music talk about another important aspect of groove: the emotions experienced during the production of an effective groove.

In order to do this, the discussion proceeds in four main stages. The initial sections provide the theoretical framework by discussing Durkheim's concept of 'collective effervescence' and Turner's related concept of 'communitas', and then consider findings from extant studies that have used these theoretical concepts in the investigation of collaborative music performance and groove. The second section uses ethnographic accounts to detail the emotions experienced by musicians during Cuban music performance and groove creation. The third section considers some of the key processes that underlie the generation of an effective-affective groove within the rhythm section: musical interaction, timing, entrainment and active participation. The final sections detail how active participation through physical movement and dance might contribute to the emotion, energy and sense of collectivity in the performance of Cuban dance music.

The Concept of Collective Effervescence

The concept of 'collective effervescence' dates back to French sociologist Émile Durkheim's ethnographic studies of Australian societies in the late nineteenth and early twentieth centuries. In his seminal book, *The Elementary Forms of Religious Life*, Durkheim uses the term collective effervescence to describe feelings of increased energy,

excitation and kinship aroused when individuals participate in group gatherings, ceremonies or rituals:

> The very act of congregating is an exceptionally powerful stimulant. Once the individuals are gathered together, a sort of electricity is generated from their closeness and quickly launches them to an extraordinary height of exaltation. Every emotion expressed resonates without interference in consciousnesses that are wide open to external impressions, each one echoing the others. The initial impulse is thereby amplified each time it is echoed, like an avalanche that grows as it goes along (Durkheim 1995 [1912]: 217, quoted in Olaveson 2001: 99).

Important components in the generation of such feelings of 'extraordinary exaltation' are close interaction and active participation in the group event. Durkheim writes of the 'revivifying' and of the 'strengthening' of sentiments generated at social gatherings through "active relations with one another" (Durkheim 1968 [1915]: 210). As well as active participation and interaction, Durkheim also stresses the importance of the intersubjective nature of the ecstatic feelings associated with the group experience, writing of the common ground that connects members of the 'tribe' or 'clan':

> All parties, political, economic, or confessional, are careful to have periodic reunions where their members may revivify their common faith by manifesting it in common...it is with people of his own clan that he has the greatest number of things in common; it is the action of this group that he feels the most directly (Durkheim 1968 [1915]: 210, 214).

Although "periodic reunions" are crucial to the development of what Durkheim called a "collective consciousness" (Durkheim 1968 [1915]: 223), helping to periodically recharge

and retemper the common ground shared by the group, the coming together of the clan does not necessarily guarantee collective effervescence. As Durkheim and several Durkheimian scholars point out, feelings of collective effervescence are often ephemeral or momentary in nature and cannot exist in a permanent or prolonged state: such feelings are a temporary condition born from "active and fluctuating communion" (Durkheim 1968 [1915]: 227; Olaveson 2001: 102).

Although often fleeting, collective effervescence is not an epiphenomenon or merely a jovial emergence of communal gatherings. According to Durkheim, collective effervescence can have profound affects on participants, often resulting in altered states of consciousness and intense experiences markedly different from 'normal' social life:

> A very intense social life always does a sort of violence to the organism, as well as to the individual consciousness, which interferes with its normal functioning (227)...men see more and differently now than in normal times. Changes are not merely of shades and degrees; men become different (211)...after a collective effervescence, men believe themselves transported into an entirely different world from the one they have before their eyes (226)...and when the assembly is dissolved and when, finding ourselves alone again, we fall back to our ordinary level, we are then able to measure the height to which we have been raised above ourselves (Durkheim 1968 [1915]: 210).

Durkheim's concept of collective effervescence then, describes an often temporary but intense, emotional, energising and otherworldly experience, provoked by active participation and close social interaction with co-participants during group events. Furthermore, these experiences are built upon intersubjectively shared thoughts, feelings and consciousnesses. The following section discusses Turner's related concept of 'communitas'.

The Concept of Communitas

Similar in nature to Durkheim's collective effervescence, anthropologist Victor Turner's theory of 'communitas' describes a state of intense comradeship and heightened energy found in ritualistic group events. Largely based on ethnographic fieldwork among the Ndembu people of Zambia conducted during the 1960s, Turner, like Durkheim, argues that the intense feelings experienced by participants during communal gatherings can be profound and go beyond those felt during everyday social life:

> The kind of communitas desired by tribesman in their rites...is not the pleasurable and effortless comradeship that can arise between friends, coworkers, or professional colleagues any day. What they seek is a transformative experience that goes to the root of the each person's being and finds in that root something profoundly communal and shared (Turner 1969: 138).

Turner, like Durkheim, did not view the "transformative experience" of communitas as fantasy or the epiphenomenon of some form of herd instinct, nor a regression to infancy (Turner 1979: 42). Turner postulates that the feeling of communitas is an ontological reality, generated by active participation in community events, built upon shared experiences and intersubjectively shared cultural models:

> The community is the repository of the whole gamut of the culture's values, norms attitudes, sentiments, and relationships. Its representatives in the specific rites – and these may vary from ritual to ritual represent the generic authority of tradition...These cultural forms provide men with a set of templates or models which are, at one level, periodical reclassifications of reality and man's relationship to society, nature, and culture. But they are more than classifications, since they incite men to action as well as to thought...communitas is not solely the product of

> biologically inherited drives released from cultural constraints. Rather is it the product of peculiarly human faculties, which include rationality, volition, and memory, and which develop with experience of life in society...men in their wholeness wholly attending (Turner 1969: 103, 128).

Although shared experiences and knowledge, and active participation are the preconditions for the occurrence of communitas, like feelings of collective effervescence, communitas is often ephemeral or momentary in nature. To distinguish this fleeting sense of communitas from other more structured and related forms (normative and ideological communitas), Turner uses the term 'existential' or 'spontaneous communitas' to represent these transient yet energising collective sentiments: "spontaneous communitas has something "magical" about it. Subjectively there is in it the feeling of endless power...spontaneous communitas is a phase, a moment, not a permanent condition" (Turner 1969: 139-140).

Turner describes spontaneous communitas as existing in the "betwixt and between" 'liminal' world (Van Gennep 1960 [1909]) that is relatively "unstructured or rudimentarily structured" – in contrast to often hierarchically structured politico-legal-economic systems – improvisational, egalitarian, voluntary and social (Turner 1969: 94-96). Making similar assertions to that of Durkheim, Turner argues that when intense emotional forces and otherworldly experiences of communitas are associated with ritual symbols (Turner 1969: 52) and 'liminal rites', they form the basis of social movements and major religious systems (Turner 1969: 177-203).

Collective Effervescence and Communitas: Connections and Critique

Even from the brief sketch of collective effervescence and communitas presented here, it is clear that Durkheim and Turner's theories are fundamentally similar and that both authors are describing related phenomena. Specifically, in their theorisations Durkheim

and Turner place an emphasis on the profound emotions and altered states of consciousness often experienced by individuals when actively participating in communal events and of the importance of culturally shared knowledge and experiences in generating these feelings. In his thoughtful comparison of collective effervescence and communitas, Olaveson (2001) makes more explicit and detailed connections between Durkheim and Turner's theories, concluding that:

> A detailed comparison demonstrates that the two scholars' concepts of collective effervescence and communitas are functionally equivalent, and that both scholars were discussing real ritual phenomena in the form of dissociative and other extraordinary states of consciousness (Olaveson 2001: 115).

I would add to Olaveson's conclusion that the strongest similarities exist, more specifically, between collective effervescence and 'spontaneous' communitas, and throughout the remainder of this chapter, the two terms are used synonymously. Olaveson also points out in his article that while Durkheim's and Turner's theories have been translated into many languages and have informed studies in a range of diverse fields from literature and arts through to tourism and play (Olaveson 2001: 92) they are not without their critics.

A criticism levelled at both authors is that the terms collective effervescence and communitas are ill defined, vague and "almost metaphysical, in quality. At times collective effervescence/communitas refers to a moral force, an intense emotional surge, and a type of collective delirium or ecstasy" (Olaveson 2001: 107). Of the two, Durkheim's theory has received the most severe criticism being described by various scholars as 'inherently evolutionist', based on "severely flawed methodology" and "logical fallacies", and suffering from the "misuse of ethnographic materials" (Olaveson 2001: 92). Nevertheless, Durkheim's and Turner's models have been in existence for around 100 and 40 years

respectively, have informed a multitude of studies in numerous disciplines and still provide a valuable framework for the discussion of the heightened emotional experiences associated with collective social events. Moreover, as Stokes (2010: 2-3) points out, the anthropological study of the relationship between music, dance and notions of community owes much to Durkheim's discussion of collective effervescence and Durkheim's ideas have inspired a great deal of contemporary ethnomusicological thinking. The discussion now turns to some applications of Durkheim and Turner's models in the field of ethnomusicology and considers the relationship between notions of collective effervescence/communitas, collaborative music performance and collective groove production.

Collaborative Music Performance and Groove

While Durkheim and Turner primarily focus on non-musical socio-collective experiences, both scholars touch upon the notion that feelings of collective effervescence/communitas are in some way linked to collaborative music performance. Durkheim, for instance, writes of how rhythm in music can act as an organising force that binds participants together and enhances the collective sentiment generated during religious ceremonies:

> Since a collective sentiment cannot express itself collectively except on the condition of observing a certain order permitting co-operation and movements in unison, these gestures and cries naturally tend to become rhythmic and regular; hence comes songs and dances...The human voice is not sufficient for the task; it is reinforced by means of artificial processes: boomerangs are beaten against each other; bull-roarers are whirled. It is probable that these instruments, the use of which is so general in the Australian religious ceremonies, are used primarily to express in a more adequate fashion the agitation felt. But while they express it, they also strengthen it. The effervescence often reaches such a point that it causes unheard-of actions (Durkheim 1968 [1915]: 216).

Although more circumspect in his theorisations, Turner also draws a connection between collaborative music performance and feelings of communitas. Writings of the 'maddening' and 'haunting' sounds of the Bāuls (a sect of musicians from Bengal) in Vaisnavism, Turner speculates that it is "fascinating to consider how often expressions of communitas are culturally linked with simple wind instruments (flutes and harmonicas) and stringed instruments. Perhaps, in addition to their ready portability, it is their capacity to convey in music the quality of spontaneous human communitas that is responsible for this" (Turner 1969: 165).

It is perhaps unsurprising, therefore, that numerous music scholars have drawn on Durkheim and Turner's models to explain the emotion-laden and powerful experiences associated with communal music-making practices in a variety of contrasting cultures (e.g. Averill 1997; Blacking 1976; Daniel 1995; Parkes 1997; Salamone 1998; Seeger 2004; Turino 1993; Washburne 1998). In his study of the music of the Venda possession dance, for example, John Blacking shows a Durkheimian influence when he writes that the power of music lies in its ability "to create another world of virtual time" (Blacking 1976: 27) and that "there is an excitement in the rhythm and in the progression of organized sound...the motion in the music alone seems to awaken in our bodies all kinds of responses" (Blacking 1976: 52). Blacking also writes of the intersubjective, creative and interactive nature of communal music making: "...the source of cultural creativity is the consciousness that springs from social cooperation and loving interaction" (Blacking 1976: 115).

Drawing directly on Turner, Salamone (1988) explores the notion that jazz performance is inherently ritualistic and that the emergence of communitas is reliant upon shared cultural structures within the jazz tradition. Specifically, Salamone argues that spontaneous and creative improvisation is built upon an intersubjectively shared set of symbolic features,

such as the typical AABA form, standard chord sequences and traditions regarding the sequence of solos. Such ritualistic practices, according to Salamone, convey "significant sociological and psychological information about the performers and their community" (Salamone 1988: 96). Salamone goes on to argue that it is only when these practices are thoroughly understood by musicians that the group can achieve "internal cohesiveness and solidarity" and "exceptional improvisation" is possible (ibid).

The studies of Salamone and Blacking are intriguing because they demonstrate how Durkheim and Turner's theories can be fruitfully applied to the investigation of collaborative music performance and illustrate how these theories might be relevant to the investigation of Cuban musical performance, both sacred and secular. For example, in chapters 1 and 3 I argued that the sacred ceremonies of Afro-Cuban *santería* were rooted in the social and the communal, and how the spiritual possession of the initiate by the *orisha* is fuelled by the intense rhythmic emotional-motional energy provided by the dynamic and interactive conversations of the *batá* drums. There are clear parallels between these musical experiences and Blacking's Durkheimian-influenced assertions, with both underscoring the centrality of participation, rhythmic interaction and culturally shared knowledge in communal music events. Parallels can also be drawn between Salamone's investigation of communitas in jazz and aspects of Cuban dance music performance. Just as the typical AABA structure helps to bind musical communities together during creative jazz improvisation, rhythmic-harmonic features such as the *clave*, and the typical bass and piano *tumbaos* (see chapter 4 and 5), might also assist in the generation of communitas by the collective mobilisation of intersubjectively shared cultural knowledge, practices and performance structures.

Parallels with extant studies are also a useful starting point for a discussion of connections between notions of groove and collective effervescence/communitas, a connection to which several music scholars have alluded (Ansdell and Pavlicevic 2005; Bigenho 2002;

Keil 1994a [1987]; Mills 2010; Washburne 1998; Zagorski-Thomas 2007). Charles Keil, for example, draws on Durkheim and participation theorist Owen Barfield to argue that the micro-timing discrepancies that underlie groove play a central role in evoking a spontaneous sense of "happiness", "pleasure", "presence", "energy" and connectedness between participants within a musical tradition (Keil 1994 [1987]). And building on Keil's notion of groove, Zagorski-Thomas (2007: 331) speculates that the synchronous timing behaviours and rhythmic entrainment processes that underlie groove-based performance may be linked to heightened states of consciousness and awareness, and religious/spiritual experiences. While Keil and Zagorski-Thomas are more cautious when building connections between Durkheim's ideas and notions of groove, Bigenho (2002), in her examination of authenticity in Bolivian music performance, is more explicit, arguing that "the fleeting moment of the groove" is connected to a shared cultural-historical experience, which she likens to "a Durkheimian collective effervescence, or heightened multi-sensorial interaction" (Bigenho 2002: 18).

Turner's communitas has also received some attention in literature on groove. For example, in Ansdell and Pavlicevic's (2005) discussion of musical communication and companionship in the 'musical community' they argue, "by coming into interactional synchrony with each person...the group falls collectively into the 'groove' of this music – which is a cultural 'place' to be together". Further, they argue that the 'cultural place' of groove is mediated by intersubjective experiences and shared feelings within the musical group: "you can only establish a groove within a musical *culture*, because it depends on recognizing and being able to participate in the particular 'feel' of the music" (Ansdell and Pavlicevic 2005: 209). Although Ansdell and Pavlicevic only make tentative connections between the culturally shared experience of groove and Turner's communitas, the influence is clear: "...the ritual quality of joint improvisation in a particular context allows an experience of *communitas*, with its sense of mutual presence, dialogue, levelling of social roles and flow of musical communication. The experience of 'The Group' could be

seen in this way: as a gradual negotiation and achievement of *communitas*" (Ansdell and Pavlicevic 2005: 210).

However, notions of communitas and groove come together most explicitly in Washburne's (1998) article on 'the swing and expression of salsa'. Washburne combines groove theory (e.g. Keil's participatory discrepancies), ethnographic data and emic knowledge and experiences (Washburne is a New York *salsero* and trombonist) to make connections between micro-timing (pushing and pulling), musicians' verbalisations of their experiences of groove and Turner's communitas. He argues that "when a band is swinging particularly well the most obvious indications are the heightened emotional responses of the participants, such as smiling, accentuated body movements, and/or occasional shouting out" (Washburne 1998: 161). Later in the same article, Washburne goes on to argue that when a salsa group interacts to negotiate a collective groove that has *sabor* (he uses the synonymous terms swing/"con filin"), "there is a desire to achieve a state that Turner describes as communitas...this requires every member of a group to work as a unit to achieve an optimum performance. A coming together of feels to groove with the hippest of swing" (Washburne 1998: 181).

Groove, Sabor and Collective Effervescence/Communitas

The above-mentioned studies suggest that there is a connection between the type of pleasurable feelings experienced during collective groove production and those sentiments described by Durkheim and Turner as collective effervescence and communitas. And Washburne's study in particular indicates that the notion of communitas is highly applicable to the investigation of groove in Cuban dance musics. Keen to explore these connections further, I began by asking musicians how it feels when the groove is working well, when the band is swinging and the music has *sabor*. Many musicians described the experience in emotive terms, speaking of increased happiness and excitation. While Michel Salazar, bassist with Cuban group Asere, was more reserved,

saying "...we feel great, good" (Michel Salazar, interview, 23/7/10), Spanish salsa singer Graciela Rodriguez described groove as euphoric: "...happy yeah. It's happy and it's euphoric and you are doing your job. You are transmitting the music as it should be. It's grooving, then its working, its great" (Graciela Rodriguez, interview, 9/4/09).

Like Graciela Rodriguez, English salsa pianist Sara McGuinness with Havana Club Descarga described the pleasurable feeling of groove in terms that suggest such feelings act as a marker that the band is 'working well':

> It doesn't feel tense once the groove's going, it's fun, it's fun if it has got a good groove, what can I say. That's what it's about, you think, I really like playing music, this is great, this is what I like to do (Sara McGuinness, interview, 23/12/09).

Making a related point, Cuban bass player Jimmy Martinez spoke of the lack of tension, warmth and effortless feeling of experiencing a good groove. He also suggested that these feelings were the marker of an effective-affective groove and the ultimate, if often elusive, goal of Cuban musical performance:

> It's brilliant, it's a very warm sensation like a very easy way to play, you are not tense or everything like that, everything is just working. When you are against that it's when you are sweating a lot and you say 'why am I sweating a lot, it wasn't like that' but it was because it was not grooving and you are trying to make sense of what is happening...that's what we aim for all the time but it's not always happening (Jimmy Martinez, interview, 16/7/10).

Whilst for these musicians collective groove production can result in euphoric sentiments and feelings of effortless relaxation, for others the feelings associated with a good groove had religious connotations. One Cuban trumpet player that I spoke to in Spain remarked that, "it is something divine, isn't it?" (Jose Fernandez, interview[9.1], 22/2/10). However, the experience of groove as something spiritual and divine is typified by the following quote from Cuban cellist Luis Varona. He spoke of the collective experience of building a groove with *sabor* as a metaphoric 'angel' that unites and energises musicians during performance:

> I'll tell you what I think, what's been investigated about sabor, it can be more appreciated in a concert. That angel that arises, that something special that wraps everything, it is not there always but sometimes that energy that unites appears and the best of music comes out. It is an angel, yes (Luis Varona, interview[9.2], 22/2/10).

Another musician, a Cuban trumpet player I spoke to in Spain, likened the experience of a good groove to both spiritual and sexual ecstasy:

> It is as if it was an orgasm, something like that, it's something exciting...and when you go on the streets in Cuba in a conga, in a rumba or in whatever, the expressions of the people in the streets...you can't miss it...it is impressive...it's like ecstasy as if it was a drug...it's something very strong...the spirituality, the gesticulation in Cuban music (Imilka Fernandez de Posada, interview[9.3], 23/2/10).

For these musicians, the pleasurable and sometimes intense and divine feelings associated with effective-collective groove production correlate with the type of "emotional forces" and "otherworldly experiences" described by Durkheim as collective

effervescence. Musicians' comments indicate that during those often-ephemeral moments when the collective groove is at its most effective and the band is swinging particularly well, they experience a powerful musical mediation of the collective social experience Durkheim describes.

There are also clear connections between musicians' comments and Turner's spontaneous communitas. For instance, Jimmy Martinez's comment that it is "what we aim for all the time but it's not always happening" and Luis Varona's "it is not there always but sometimes that energy that unites appears" speak directly to the energising and collectivist yet highly ephemeral nature of the collective groove experience, an experience that is captured perfectly by Turner's notion of 'spontaneous communitas'. Furthermore, Luis Varona's point that during these energised moments "the best of music comes out", correlates with Durkheim and Turner's assertions that the liberating forces of collective effervescence/communitas are often linked with intense artistic and social creativity (Olaveson 2001: 103).

The evidence presented in this section strongly suggests that musicians can experience feelings of collective effervescence and communitas during effective-collective groove production. The following sections, therefore, aim to explore one further aspect of this collective phenomenon: the idea put forward by Durkheim and Turner that these experiences and feelings are rendered by intersubjectively shared knowledge and experiences, and by close interaction between participants in collective events.

Timing, Entrainment and Intersubjectivity

In earlier chapters, I argued that various aspects of macro- and micro-timing between rhythm section players (instantaneous tempo, phase relationships and group tempo) shaped collective groove production, adding a layer of excitement, drive and energy to the performance. Furthermore, I explored the notion that socio-musical entrainment – or

rhythmic interaction and timing adjustment – was a key process that guides and maintains the desired level of synchronicity between rhythm section musicians during the generation of a dynamical groove.

When I asked musicians what makes an effective ensemble groove and how that groove feels, many highlighted the connection between the generation of a collective groove and the underlying interactive timing and socio-musical entrainment processes. For example, Andy Martin, percussionist with Riamba, said that:

> From a musician's, from a player's point of view, I think it's that feeling of you are doing your job with your instrument and it's just happily locking in with everybody else i.e. the bass player, the pianist. [It feels] happy, relaxed and it just feels good, brings a smile to your face if you know it's just ticking over. And I think that's got nothing to do with whether the music, going back to technical terms, whether it does slightly rush, I'm not talking about metronomic precision but if it feels good (Andy Martin, interview, 30/3/09).

Here, Andy Martin is making a clear connection between the "happy" and "relaxed" feel of an effective groove, timing ('rushing', "metronomic precision", "it's just ticking over") and the underlying processes of rhythmic interaction and socio-musical entrainment: "just happily locking in with everybody else". Providing an alternative perspective on this connection, he went on to describe the feelings associated with experiencing a rhythm-section groove that was less than effective:

> As opposed to when you are working with a similar setup, let's say a bass and piano and let's say it's not grooving you just have that edge. You have a feeling of,

> am I dragging, am I pushing and you end up loosing confidence in your own playing because you are thinking, 'I am sure I am right but it's sitting with the bass player or it's not sitting with the pianist', so one of us is doing something, it's not happening. It certainly brings sadness [laughs], sadness to everyone. I think it probably creates a tension in one's playing, in one's own personal playing, because your mind then starts concentrating or focussing on why it isn't sitting as opposed to it just happening (Andy Martin, interview, 30/3/09).

Again, Andy Martin is making clear connections between interactive timing relationships in the rhythm section ("dragging", "pushing") and how groove feels and is experienced. In this particular scenario, the sensation of "tension" and "edge" associated with a groove that is not quite "sitting" comfortably. Cuban bass player Jimmy Martinez also attributed feelings of discomfort to a less than effective groove and spoke of how micro-timing adjustments and interactions between rhythm section players can evoke unpleasant feelings:

> A bad groove could be for me like when if just imagine yourself with a stone in your shoes and you cannot, the rhythm of your bass will change completely. It's painful, it will be like [mimes difficult walking] that semi-quaver there, no it's not that, it shouldn't be there, that will stop the groove. It's just as easy as that, or if you've got very comfortable Nikes, yeah, that's sweet, that's cool, that's the groove (Jimmy Martinez, interview, 16/7/10).

Jimmy Martinez's "painful" walking metaphor is well chosen and I am sure is one that would resonate with many musicians who actively participate in the performance of groove-based musics. His vivid description and careful choice of words (and painful limping mime) perfectly convey the discomfort, awkwardness and lack of motion felt by

participants when they experience a collective groove that simply 'feels' wrong and does not 'sit' well. His description of groove production also suggests that there is an underlying process of rhythmic interaction and socio-musical entrainment between players. His words, "that semi-quaver there, no it's not that, it shouldn't be there", skilfully describes the process of micro-timing adjustment and entrainment that occurs between rhythm section players and conveys a sense that these gradual and probing micro-rhythmic negotiations are fundamental to the production of a "very comfortable" (or "painful") feeling groove. These findings resonate with the ethnographic and timing data presented in the previous chapters, where it was argued that socio-musical entrainment is a key process that underlies synchronous ensemble behaviour and helps to 'lock' rhythm section musicians together when negotiating an effective-collective groove during live performance.

Ethnographic evidence from extant studies suggests that musicians who perform other styles of groove-based music can experience similar feelings to those described here by performers of Cuban music. Jazz musicians, for instance, have described the feel of a good groove as like "walking down the street" with someone, "the euphoria that comes from playing good time *with* somebody", "feeling like time itself is pleasurable" and the more extreme, "being out of yourself" in a trance-like state (Monson 1996: 68; see also Berliner 1994: 388). When I asked Riamba's pianist, Hamish Balfour, who is also an accomplished jazz musician, to describe the feel of Cuban dance music, he spoke of a similar sense of joyous motion experienced during groove production when performing both jazz and Cuban-related styles:

> Just the sense of joy. I've never been to Cuba. I've been all over south and central America and you can see it in the people they are so happy when this music's being played it's just like a wonderful interaction. Jazz music is a different side of it that I think is more the improvisatory approach to it, but as far as Cuban music

> goes it's something about the groove...every single instrument is solely responsible and it only works when everyone's doing it correctly...so it's just like a feeling. I don't think you can find it in many other forms of music really...funk, pop, rock all that stuff it's like a ball bouncing on the spot. Whereas jazz music is like a ball bouncing forwards. It's got that motion. And to me Latin music, Cuban son stuff is kind of the same, it's moving. So it has space to move (Hamish Balfour, interview, 9/4/09).

Hamish Balfour's 'ball bouncing forward' metaphor, like Jimmy Martinez's 'comfortable walking metaphor', vividly conveys the sense of motion experienced when the collective groove just feels 'right'. He suggests that the groove feels 'right' when there is a "sense of joy" and "wonderful interaction" between participants and instrumentalists are playing the correct rhythmic patterns executed with the appropriate timing and aesthetics.

These comments provide an interesting point of connection with arguments made in previous chapters. For example, in chapter 3 I presented the argument that the Cuban *sabor* aesthetic signifies a unified collective sound, a sound that is born from the dynamic, rhythmic interactions and improvisatory conversations between individuals within the ensemble. In addition, in chapters 4 and 5 I argued that certain intersubjectively shared cultural models embody a characteristic tension-and-release dynamic and that a connection may exist between this dynamic and the powerful emotional responses to the groove of Cuban dance music. The experiences of the musicians cited above seem to suggest that when these interrelated dimensions of collective groove production and aesthetics (e.g. socio-musical entrainment, synchronous rhythmic interaction, collectivist performance sensibilities, the execution of key rhythmic patterns with the 'correct' aesthetic) find unity during live performance, participants can experience heightened emotional states. As Hamish Balfour puts it: "it's something about the groove...every

single instrument is solely responsible and it only works when everyone's doing it correctly...so it's just like a feeling", a "wonderful interaction", a "sense of joy".

This connection between intersubjectively shared knowledge and experiences, socio-musical entrainment processes, Cuban musical aesthetics and the heightened emotional states often experienced by participants is underscored by the following quotes from Cuban pianist Imilka Fernandez de Posada, who earlier likened the feel of a groove with *sabor* to an orgasm or drug-induced euphoria. Later during the same interview, she spoke of the interactive and communicative processes that help to evoke these rich and intense emotions:

> It [sabor] is about who plays it, who makes it and how he makes it...I shine if you make me shine as well...it's useless to have a stellar technique if when I play with you, you can't take the best from me...if there's no communication among the musicians it becomes difficult. But when they are interacting, 'but look what I'm doing on the bass, yes, but look what I'm gonna give you on the piano, yes, look what I'm gonna do with the trumpet'. So, when that is there, it works! But in order to have that moment of that thing that you feel, that drags you, there has to be a different communication, you know? And it all depends on what you give me, for me to give you. The more you give me the more I give you. It's like a relationship: tasty, sexy. Yes, it has to give something like that, very rich (Imilka Fernandez de Posada, interview[9.4], 23/2/10).

These comments are interesting and insightful for several reasons. Firstly, her remark that, "that moment of that thing that you feel, that drags you", suggests that a groove with *sabor* somehow has a certain power and sense of forward momentum that has the capacity to drag and pull participants along with it. Secondly, she underscores the

importance of communication and socio-musical interaction and how these processes can help to generate heightened emotional states: "the more you give me the more I give you. It's like a relationship: tasty, sexy". Thirdly, her comment that *sabor* "is about who plays it, who makes it and how he makes it...I shine if you make me shine" highlights the collectivist, interactive and interpersonal nature of effective-affective groove production and Cuban musical aesthetics. Intrigued by her description of the processes that underlie "that moment" during performance, I asked her to elaborate further on how those moments felt. She said that:

> It is vibration, it is difficult, it is when we vibrate together. It is when we are all in the same frequency of vibration. It is something spiritual, something that cannot be quantified. It's something qualitative. It's something that has to be felt. That's my opinion. It's not something that we could say: 'in order to have sabor this has to happen'. Maybe you pick up a recording of one of those moments and you transcribe it. You transcribe it but you can't play it the way it has to be played, even though you respect all the signs, the dots, the elements. Even if you respect all that and there is no sabor. It's not in the fact that you do it perfectly, sabor doesn't have to be perfect, it's a matter of feel...it is when we are all in the same coordination, when we all synchronise (Imilka Fernandez de Posada, interview[9.5], 23/2/10).

Interestingly Imilka Fernandez de Posada's argument that *sabor* is generated within the group "when we are all in the same frequency of vibration...it is when we are all in the same coordination, when we all synchronise" highlights the importance of social-musical entrainment processes and the crucial role they play in generating and maintaining group synchronicity. Furthermore, for her there is a clear connection between these shared synchronous states, Cuban musical aesthetics and Durkheimian-like sentiments: "it is something spiritual, something that cannot be quantified. It's something qualitative. It's

something that has to be felt". Finally, like Durkheim and Turner, she speaks of the ephemeral, often-elusive and intersubjective nature of the intense sentiments associated with the socio-collective experience: "maybe you pick up a recording of one of those moments and you transcribe it. You transcribe it but you can't play it the way it has to be played, even though you respect all the signs, the dots, the elements. Even if you respect all that and there is no sabor".

The ethnographic accounts presented here provide convincing evidence of the connection between the feelings experienced by musicians during collective groove production and notions of collective effervescence and communitas. Specifically, this evidence suggests that when ensemble musicians intersubjectively share knowledge and experiences and actively engage in socio-musical entrainment in order to maintain a synchronous state and generate a collect groove with *sabor*, they can experience intense and heightened emotional states. These pleasurable feelings can be viewed as a musically meditated version of the social experience described by Durkheim and Turner. Although these joyous and powerful feelings are often elusive and momentary in nature, this 'musical effervescence' emerges when musicians play well together, the band is synchronised and key elements of the aesthetic system come together during live performance. The following section aims to explore some of these ideas further by considering the role physical movement and embodiment might play in generating these powerful socio-collective musical experiences.

Physical Movement and Embodiment

When considering how intersubjectivity and the process of socio-musical entrainment might engender moments of collective effervescence and communitas during effective groove production, it is also interesting to explore how physical movement might contribute to such moments. During fieldwork in Cuba, it became strikingly apparent that there was a deep-rooted connection between physical movement and Cuban musical

performance. Observing musicians perform, I noted an array of physical behaviours ranging from face and shoulder twitching, head-nodding, blinking, swaying, breathing and foot-tapping in time with the music, through to more schooled behaviours such as choreographed footwork. Additionally, during my own performance experiences playing bass and percussion in the UK and Havana, I have noticed that a degree of physical movement, in addition to the necessary body movement required to play a given instrument, helps me to engage fully with the music-making process and to contribute wholly to collective groove production.

Numerous scholars typically refer to this type of full and meaningful engagement of mind and body as an embodied experience (e.g. Johnson 1987; Lakoff and Johnson 1999; Lidov 1987). Interestingly, scholars concerned with notions of 'social embodiment' have established important links between entrainment processes and synchronous bodily action during effective social interaction (Barsalou et al 2003), whilst others have argued that embodiment plays a key role in understanding intersubjectivity and the production of positive emotion states experienced in social and communal situations (Niedenthal et al 2005; Norris 2001).

To explore further the connections between physical movements, notions of embodiment and Durkheimian-like emotional states of performers when generating an effective-collective groove, I asked musicians if they move when they play and if that movement is an important aspect of groove creation. Cuban percussionist, Marcos Gregorio, now resident in Spain, spoke of his experiences recording film music in Cuba with *santería batá* players and of how bodily movement is intertwined with the intuitive feel of Cuban musical performance:

> You can't teach the movement, it has to come out of yourself. There is nothing that says: 'to play montuno you have to move in this or that way and to play mozambique you have to move like this', no, that is dance, that is something different. It's whatever you feel inside. If I am playing, moving a bit...you feel a thing, butterflies in your stomach inside, you feel the bass, you sing it. We had an experience there in Cuba, recording music for a film, and it was music that had batá players...and there was a noise in the studio, and the technician was like: 'there is a noise, it's not a chair, it's not a music stand, it's a noise and I don't know what it is'. And it was...the batáseros playing [mimes playing batá with guttural sounds and rhythmic breathing]...they were professional in their own field, but not studio musicians. So they couldn't help it and I think that, myself, when I've been playing tumbadoras, I've also done that...you have to play it and feel it. But one also dances to the musical rhythm, I think you play better (Marcos Gregorio, interview[9.6], 24/2/10).

For Marcos Gregorio, moving while playing *tumbadoras* (congas) is a highly embodied experience, one that is connected with sensations of excitation and arousal ('butterflies in the stomach') and feelings of full bodily engagement with the music ('one dances to the musical rhythm', "you feel the bass, you sing it"). Further, he emphasises the organic and personalised nature of expressive bodily movement ("you can't teach the movement, it has to come out of yourself...it's whatever you feel inside"), and the very practical benefits: "I think you play better". This final point correlates with well-reported findings in music performance literature, which details how a certain level of bodily excitation and arousal (increased heart and breathing rates, etc.) can improve concentration, performance accuracy, energy and evoke inspired feelings during a performance (Davidson 2001: 236-237).

Other Cuban musicians also spoke of how bodily movement was deeply intertwined with the expressive feel of Cuban musical performance. Carlos Puisseaux, percussionist with Cuban *son* group Sierra Maestra, commented that bodily movement was not merely a by-product of expressive musical performance, but a vital ingredient in Cuban musical culture:

> The musicians' movement, in Cuban music, is the Christ. There is no Cuban music without movements. It is something that is carried on in the same feeling. We say that it is carried in the bomba, in the heart, but really it is in the brain, isn't it? But it is something intrinsic in Cuban music, the movement. Either tapping with your feet or doing something, a [bodily] movement like this. Because it wouldn't be credible. It's the way of expressing one's feeling playing that music. Of course, because one expresses and feels when playing, and with the movement you also express (Carlos Puisseaux, Sierra Maestra group interview[9.7], 13/4/10).

Carlos Puisseaux's comment that "there is no Cuban music without movements...because it wouldn't be credible" suggests that although physical movement may be, as Marcos Gregorio suggests earlier, a highly personalised expression of the performer's emotional state, there is also a shared cultural dimension to this form of expressive bodily behaviour. As Carlos Puisseaux asserts, the way in which a performer taps their foot or moves their body in a particular manner may act as a marker of a "credible" Cuban performance. This idea correlates with findings presented in chapter 4 where musicians reported how tapping a half-note pulse with their foot, as opposed to a quarter-note pulse, was more authentically Cuban, more aesthetically pleasing to Cuban musical sensibilities and helped to produce music with the correct feel and flavour.

The following set of quotes, all from members of Cuban *son* group Asere, reinforces these ideas and provides important connections with groove production and notions of collective effervescence and communitas. Asere's guitarist and *tresero* Alejandro Albar said that:

> I think it [physical movement] is important, yes. It's like participating in what is happening. To abandon your body to what is happening...and now that I do it I feel different, you play with more swing and all. That helps you to lose the stage fright too. When you stand on a stage and you feel a bit nervous. If you participate in what you're doing and you feel it, you can move a bit and yes, you relax and feel good.
>
> There are concerts where it doesn't come out very well because we may be tired or haven't slept much and you are playing and you can feel that the music is not there, transmitting. There isn't much energy on stage in that moment...so, when you feel that energy, that vibe it gives you, the bass here in the chest and you feel, you play with swing, you play with sabor. And it's not a case of making it on purpose, it just happens like that, and you play well, happy, content. That's the way I feel it. If that energy hasn't reached me I don't feel good (Alejandro Albar, interview[9.8], 23/7/10).

In the first paragraph, Alejandro Albar makes clear and explicit connections between active bodily participation ("abandon your body to what is happening"), groove and timing (playing "with more swing") and the powerful effect that active bodily participation and groove can have on emotional states ("you relax and feel good"). And in the second paragraph, he makes a clear connection between such pleasurable bodily/emotional states (increased "energy...the bass here in the chest" and "happy, content" feelings) that he receives through participation with co-performers and the direct effect these states have on his own aesthetic performance ("you play with swing, you play with sabor"). In addition, Alejandro Albar's comment that, "there isn't much energy on stage in that

moment...it's not a case of making it on purpose, it just happens like that" suggest that these pleasurable musical moments are fleeting and unpredictable in nature. Alejandro Albar's description of collective music making fits perfectly with many of the key aspects of Durkheim's notion of collective effervescence and Turner's spontaneous communitas: in particular, the ephemeral nature of the energising and uplifting feelings associated with collective action and the importance of 'active relations with one another' in generating such emotional states.

When I asked Alejandro Albar's co-performers, percussionists Juan Alarcon and Vicente Areucibia, if they moved when performing Juan Alarcon said, "Yes, all the time" and when I followed with the question, 'is movement an important and necessary aspect of performance', Vicente Areucibia said, "No, it's compulsory!" and laughed. He went on to explain how physical movement was crucial to the performance: "I prefer that [moving when playing] because this [not moving] doesn't have swing, even we have to play around with that because it helps the technique" (Vicente Areucibia, interview[9.9], 23/7/10). Juan Alarcon added that even with the slightly restrictive practice of playing congas seated, bodily movement is paramount:

> Sometimes we've arrived tired for a concert...and in the first song, one feels like tired. Not even five or six bars have passed and you can't even move your feet because if you are seated at least you can move your torso a bit and Vicente and me look at each other and 'make the party', as we say (Juan Alarcon, interview[9.10], 23/7/10).

Vicente Areucibia's comments that movement is "compulsory", that he prefers to move because then he plays with "swing" and it "helps the technique" firmly underscore musicians' earlier comments that bodily movement can improve technical performance on the instrument, influence groove and timing, and act as a marker of a credible Cuban

performance. In addition, Juan Alarcon's comment that "Vicente and me look at each other and 'make the party'" by moving the "torso a bit" speaks squarely to the idea that rhythm-section groove production is a deeply embodied experience built upon active bodily participation and socio-musical interaction. Furthermore, his suggestion that by using the body in the music-making process a performer can overcome tiredness and add energy to the performance resonates with the notion that feelings of collective effervescence and spontaneous communitas are a transformative experience, provoked by full engagement, intersubjectivity and dynamic involvement in the collective event. The final section in this chapter expands the focus slightly by exploring how dynamic involvement through physical movement and dance by audience members might contribute to euphoric moments during performance.

Movement, Dance and Audience Participation

As part of my fieldwork in Cuba and the UK and during my own performance experiences, it became apparent that, in addition to the connection between musicians' physical movements and collective groove production, audiences also added to the sense of collectivity through movement and dance. These behaviours range from twitching in their seats, tapping their feet and clapping the *clave* in time with the music, through to more choreographed dance movement. As a musician and ethnomusicologist, I am not adequately qualified to explore the detailed relationship between the structured timing of dancers' steps and the groove of rhythm-section players, although such an approach would, as Keil (1994 [1987]: 101) suggests, provide a richer understanding of the generation of participatory groove. Therefore, the aim of this section is to provide a broader perspective by examining the relationship between collective groove production and audience involvement through movement and dance. It is further to discover how this type of embodied participation might contribute to moments of musical effervescence and communitas.

Drawing directly on Durkheim's work, ethnomusicologist Byron Dueck details the relationship between physical movement and heightened emotional states in his study of aboriginal square dancing communities in the Canadian province of Manitoba. He argues that there is a "core relationship between physical activity and emotional experience...participatory music making and dancing cue and are cued by collective affective experience; they are the means by which participants express and achieve heightened emotional states" (Dueck 2006: 50). He continues by describing how during such activities dancers "progressively undergo a physical transformation, expending more and more energy until they glow with exertion...participants also glow emotionally at the end of the dance: they are happy, or exhilarated, or excited. Their physical and emotional transformation is not an individual experience but a collective one; in Durkheimian terms, it manifests the power and force of collectivity" (Dueck 2006: 52).

Similarly, several dance scholars have also explored the idea that movement and dance has an energising effect that adds a sense of euphoria and presence to music performance events. Anthropologist Judith Hanna, for example, reports altered states of consciousness in Balinese dance: "the deliberate pursuit of vertigo, self-loss, giddiness, through high speed is common in dance: the Balinese speak of 'the other mind' that can be reached through music and dancing" (Hanna 1979: 28). And Tomie Hahn argues that in *nihon buyo*, a traditional Japanese dance form, dancers project "a vibrance of energy, or presence", that arises during music/dance events, which she likens to the physical and mental state of "optimal experience" described by Csikszentmihalyi as "flow" (Hahn 2007: 165).

Interestingly, in his later writings Turner discussed the similarities between his theory of communitas and Csikszentmihalyi's notion of flow, arguing that "what I call *communitas* has something of a 'flow' quality about it, but it may arise, and often does arise, spontaneously and unanticipated – it does not need rules to trigger it off" (Turner 1979:

58). Here, Turner alludes to the idea that the flow experience is a more structured and rule-based phenomenon when compared to the experience of spontaneous communitas, one that usually occurs in structured activities such as games, ritual events, sports and artistic performances (Csikszentmihalyi 1997, 2008; Csikszentmihalyi and Csikszentmihalyi 1988; Csikszentmihalyi and Rich 1997). On closer inspection, further differences between flow and communitas become apparent. Firstly, as Turner points out, communitas is a more intersubjectively shared and interpersonal experience, one that emerges from ensemble action and interaction: "...'flow' is experienced within an individual, whereas communitas at its inception is evidently between or among individuals – it is what all of us believe we share and its outputs emerge from dialogue, using both words and non-verbal means of communication" (Turner 1979: 58). Secondly, Csikszentmihalyi's work has been criticised for primarily discussing a Western psychic phenomenon by implying that participants are actively engaged in skill development and goal-directed behaviour (Carl 2010). Communitas, by contrast, does not have to be induced by goal-orientated behaviour, structure and rules: "communitas is something else, for it does not have to be induced by rules – it can happen anywhere, often in despite of rules" (Turner 1979: 59).

While I share Turner's assertions that flow, when compared to the experience of communitas, is principally a more individualistic, goal-directed and structured phenomena, Csikszentmihalyi does present arguments that suggest his ideas may be applicable to certain aspects of ensemble groove production and emergent feelings of musical effervescence and communitas. For instance, he discusses feelings of excitation that people experience during 'flow states' and of the momentary and fleeting nature of these sentiments: "on the rare occasions that it happens, we feel a sense of exhilaration, a deep sense of enjoyment that is long cherished" (Csikszentmihalyi 2008: 3). Furthermore, Csikszentmihalyi alludes to the profound and intersubjectively shared nature of the collective flow experience. He writes of "the joy of belonging to a more complex system that joins separate consciousnesses in a unified goal" (Csikszentmihalyi 2008: 185). More

specifically, he argues that during music/dance events dancers "get sort of a physical high from it...very feverish or sort of ecstatic when everything is going really well". In one dancer's words: "...it's a body language kind of communicative medium, in a way...When it's going good, I'm really expressing myself well in terms of the music and in terms of the people that are out there" (Csikszentmihalyi 2008: 100).

The above-mentioned studies suggest that there may be an important integrative dialogue between collective music-making and embodied audience participation in music/dance events. Furthermore, they suggest that this integrative dialogue may contribute to feelings of musical effervescence, communitas and a type of musical 'group flow' experience. In order to explore these ideas further in a Cuban context, I asked musicians if audience participation through movement and dance was an important aspect of Cuban musical performance. Cuban pianist and guitarist Alina Carmona, now living in London, recounted a performance experience at a live session for Cuban radio and spoke of the importance of audience participation through movement, even when seated:

> I remember when I was in Cuba someone wanted to take us to do a radio station and he said 'can I hear the kind of music that you do' and then we start playing, and when we finish, no, while we were playing he did this to us [points, meaning look at the audience] because the people that were near to us were [moving in their seats] then it the proof that you are doing well because once the people are moving just a little bit of their bodies, that means that they are feeling what you are playing (Alina Carmona, interview, 28/8/10).

For Alina Carmona, audience participation through movement is, as she puts it, "proof that you are doing well". Her co-performer, Cuban *son* and salsa violinist Gabriel Fonseca, made a related point: "you have to feel this. You go to Cuba, you go and listen to a Cuban

band or something like that, if you don't feel this here in your legs, something is going wrong" (Gabriel Fonseca, interview, 28/8/10). English jazz and salsa pianist, Hamish Balfour, spoke of the importance of audience involvement through movement and dance and its relationship to groove in Cuban dance music:

> If a band is grooving...you would be hard pushed to find anyone not at least tapping their foot. If they are a really killer band then you know you can't help it...as a musician as well you are going to feed off it...if everyone's up there dancing and having a good time you're gonna feel better about what you are doing. Yeah you are gonna start moving yourself and hopefully it'll get better from there. Whereas if everyone's sitting there sweating and cursing and not enjoying the music and walking out the exit then maybe you are not gonna play it as well...it's just the basic raw kind of energy, people having fun and expressing themselves (Hamish Balfour, interview, 9/4/09).

For these musicians, the connection between music performance and audience participation through movement and dance is twofold. First, as Alina Carmona and Gabriel Fonseca suggest, audience participation functions as a barometer indicating that the band are playing well and the groove is aesthetically correct. Second, as Hamish Balfour stresses, there is often a reciprocal dialogue between the musicians' groove and the audience, a dialogue that involves an exchange of energy, presence and emotional states: "you are going to feed off it...if everyone's up there dancing and having a good time you're gonna feel better about what you are doing".

Once again, socio-musical entrainment may be a key process that facilitates this integrative dialogue between musicians, dancers and the audience. The following quote

taken from an interview with *rumbero*, singer, percussionist and dancer with Cuban *rumba* group Clave y Guaguancó, adds more weight to this argument:

> When music has sabor, all the components, everyone who participates in that moment in the music, everybody is happy, because it is the result of a good piece of work. On the contrary, if a musician, a percussionist or an instrumentalist, is in one place, the singer in another place, the dancers in another place, there is no sabor, there is nothing...everything needs to be compact, synchronised, in order to have a general feeling to it. Not only the dancer has to have sabor and enjoy what he is doing, or the singer enjoys what he is doing without caring about what the dancer and the musicians are doing, no. Everything has to be synchronised, and if everything is synchronised, then everybody is happy...they go together, they're not two separate things. There isn't dance without music. Nor music without dance (Jesus Martinez, interview[9.11], 6/4/10).

Jesus Martinez's comment that for the music to have *sabor*, musicians, dancers and singers, "everyone who participates in that moment in the music" need to be synchronised and that "if everything is synchronised, then everybody is happy" makes a strong connection between Cuban musical aesthetics, socio-musical entrainment processes, notions of collectivity and the resultant emotional responses. This connection has been explored in non-Cuban dance styles as well. For example, in her book, *The Body, Dance and Cultural Theory*, Helen Thomas draws on research into ballet performance, arguing that, "ballet is almost always performed to music, and often live music, and the choreography generally attempts to 'visualise' the sounds or the mood of the musical structure. 'Synchronised movement'...can give power to the music and make the music 'an embodied thing'" (Thomas 2003: 99).

Similarly, in her study of the relationship between music and the body in everyday life, DeNora (2000) argues that innate entrainment processes drive the synchronisation of bodily movements to music (DeNora 2000: 78) and that when the body is synchronised to music during dance it "may provide a basis for the formulation of emotional matters, energy levels and action styles" (DeNora 2000: 145). Clearly, there is an important distinction to be made between the more schooled and highly crafted choreographies of dancers in ballet, or some *son, rumba* and salsa performances, and as DeNora (2000: 78) puts it, "the more mundane and subconscious forms of choreography" such as foot tapping, swaying etc. – a distinction that would require a dedicated study to explore fully. However, the above evidence does bring sharply into focus the important relationship that exists between musical aesthetics, socio-musical entrainment, moments of heightened emotional experiences and participation through physical movement and dance in collective music/dance events. Specifically, it suggests that when audience members participate through movement and when dancers are entrained to the musicians' groove their physical movements might contribute to the characteristic energy, flow and moments of musical effervescence typically associated with Cuban music/dance events.

Several scholars present compelling arguments that suggest this may be the case. Blacking, for example, draws on Durkheim to argue that communal dancing and music making is at its most exciting and valuable when participants experience "bodily resonance, or true fellow-feeling". He describes these experiences as moments of increased "energy flow" and as "peak-experiences", where musicians and audiences are lost in the rhythm, producing flow-like "transcendental somatic states" (Blacking 1977b: 7). And Waterman describes how one of the most important aspects of West African Jùjú performance is the musicians' ability to 'tune-in' to one another and "to establish a special flow of lived time" that provides the context for and helps to 'shape' social events (Waterman 1990b: 215).

Similarly, in Daniel's 1995 study of music and dance in Afro-Cuban *rumba*, she makes the argument that in all kinds of *rumba* performance the rhythmical movements of the dancers' bodies generates dynamic 'kinaesthetic energy' and can engender a sense of collectivity and participation. She writes that "this energy can remain among performers only, but in rumba performance it often crosses the audience/performer boundary and, even within a culturally unconditioned spectator group, it can induce pleasurable feelings and behavioural expressions" (Daniel 1995: 110). She goes on to explain how a "culturally unconditioned spectator group" can feel *rumba*'s "surge of energy" and are pulled along by the "energy flow of rumba dancing" and the power of exquisite and dynamic musical performances.

For Daniel, as for *rumbero* Jesus Martinez, the important components that form the bedrock of the participatory *rumba* experience are the coming together of all aspects of the artistic system (e.g. the masterful execution of rhythmic patterns, sensuous and synchronised choreographies, joyous singing, expressive gesticulations) and the spontaneous and rich integrative dialogue between performers, dancers and audience members. When these elements do find union in live performance situations, according to Daniel, a "commonness of feeling" is generated that has the energy and power to overcome the disunity of disparate "ethnicities, classes or cultures" and transport participants into the liminal world of communitas:

> The rumba event generates and accumulates multiple sensory stimuli which urge individuals and encourage groups to cross into the aesthetic realm of ultra-sensitivity. The liminal world of "betwixt and between"...so characteristic of the aesthetic mode, transforms spectators into participants and transports them to the zone of communitas (Daniel 1995: 136).

Although Daniel is discussing communtias in relation to *rumba* performance and is describing participatory experiences that are very much rooted in Cuban soil, moments of communitas, and the performance sensibilities that help to generate them, are also reported in the case of other Cuban-related music/dance forms. For example, I asked English salsa dancer Chris Bicourt what drew him to Cuban-related dance styles and how it feels in those moments when the band are swinging and playing with *sabor*. He recounted his experiences of learning salsa and *rumba* in Cuba, and *samba* in Brazil:

> The music carries you away, and when talking Cuban music and Brazilian music, it's incredibly emotional and it moves you, that vibrating pulse gets you in here [in the chest/body], as a dancer probably more than most musicians because it moves you...that clave rhythm...the body wants to go, there's an unsaid something there which pulls you physically to it and I love that about Afro-Cuban music. With traditional samba...when you dance you enter a dialogue with the drums and it's a two way thing...it can happen, and when it does it's a beautiful moment...it's something beyond everyday life, it's something that elevates you to something more profound...music and dance, dance especially for me, dance is very liberating, very addictive but when you go over there [Cuba and Brazil]...there's another stage to it which is that religious aspect, there's that deep spiritual aspect and there's a big community aspect to it as well. In these countries, it's all about what brings you together as a community I think and how you relate to other people (Chris Bicourt, interview, 16/3/10).

Chris Bicourt's insightful comments serve as a perfect full stop to the end of this section, neatly bringing together many of its themes. He speaks of the importance of an integrative dialogue between dancers and musicians, the bringing together of people in a shared communal experience through participatory music and dance and the intense embodied, emotional and otherworldly, yet often momentary feelings associated with this type of

collective socio-musical experience. Moreover, many of his comments correlate with arguments developed in previous chapters. For example, the importance of shared cultural models ("that clave rhythm", see chapters 4) for the emergence of musical effervescence and communitas and the significance of the interconnectedness between music, dance and religious and everyday community life in Cuba (chapter 3).

To summarise the main points in this chapter, Durkheim's concept of collective effervescence and Turner's related concept of communitas provide a useful theoretical framework for the discussion of the increased levels of excitation, energy and euphoric feelings sometimes experienced through participation in Cuban-related music/dance events. These profound, often-momentary and ecstatic feelings are evoked through rhythm-section musicians engaging in rhythmic interaction and socio-musical entrainment as they seek to negotiate a collective, effective and affective groove that has *sabor*. This 'musical effervescence' is most likely to emerge when musicians intersubjectively share knowledge and experiences, the band is tightly synchronised and entrained, and key rhythmic-harmonic elements are executed with the appropriate feel and timing.

Physical movement and dance by performers and the audience both respond and contribute to groove-induced moments of 'musical effervescence' and communitas. In addition, it is likely that during these moments participants experience flow-like states, or a type of musical 'group flow'. When audience members participate through physical movement and when dancers are synchronised to the musicians' groove, their physical movements generate kinaesthetic energy that enhances the effectiveness of groove and contributes to the characteristic sense of energy, flow and musical effervescence typically associated with Cuban music/dance events. When key elements and processes of the artistic system find unity during performance situations – i.e. the musicians' exquisitely crafted groove and the dancers' perfectly timed synchronised movements – the resultant aesthetic experience has the capacity to generate a surge of dynamic energy, emotion

and power that adds to the sense of musical effervescence/communitas, collectivity and invites audience participation through movement and dance.

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Chapter 10

Conclusion

Research Findings

In the introduction to this study, I offered some initial thoughts about groove drawn from my experiences performing Cuban musics in the UK, from conducting fieldwork in Cuba and from surveys of themes and theoretical perspectives presented in academic literature. These different perspectives led to the formulation of one overarching research question: what is the nature of a successful groove in *son* and salsa performance? In attempting to answer this broad question, my primary focus was the investigation of the shared knowledge, aesthetics and socio-musical processes that shape effective-collective groove production in *son* and salsa styles. The following research findings shed considerable light on these related aspects of groove production.

In chapter 3, I explored one important aspect of groove production: the *sabor* aesthetic. For Cuban musicians, the term *sabor,* which literally means to play with 'taste' or 'flavour', is multifaceted signifying a Cuban sense of musicality and approach to music performance. Firstly, *sabor* denotes the sense of purpose, energy, rhythmicality and emotion that charges an individual's performance. Secondly, the term is used to refer to the collective unified sound generated by the dynamic, rhythmic and interactive behaviours of the individuals that comprise the ensemble. Thirdly, this interactive and collectivist approach to music making is intertwined with shared knowledge of the musical tradition and intersubjective knowledge of how to interact effectively with co-performers within that tradition. It is highly likely that musical intersubjectivity, like intersubjectivity in everyday social interaction, is constructed through purposeful interaction between performers and provides the common ground that facilitates successful collective action. Lastly, for some Cuban musicians, *sabor* denotes Cuba's rich and diverse musical and

cultural heritage. In particular, it is deeply intertwined with the socio-musical practices, communicative energies and collectivist and participatory attitudes of working-class communities. Arguments presented by Cuban scholars and performers of Cuban musics strongly suggest that the musical sensibilities embodied in these community practices are the potent aesthetic force behind internationally received styles such as *son* and salsa.

In chapters 4 and 5, I explored several technical aspects of the rhythmic-harmonic framework within which musicians interact to create a collective groove. Discussions presented in chapter 4 revealed that the *clave* forms the basis of this structural framework and represents an important and pervasive cultural model within the Cuban musical tradition, functioning as a timekeeper and guide to aesthetic choices and interactive behaviours of musicians, dancers and singers. The *clave* also has an important relationship to the tactus or pulse. I presented arguments which suggest that when the half-note pulse is marked with the *clave*, a dynamic of tension and release can ensue, a dynamic that has the ability to grab the attentional energy of listeners, provoke engagement, arouse emotions and inject a sense of rhythmic energy, motion and drive into the groove. Building on arguments in chapter 4, in chapter 5 I explored the *tumbaos*, played within the rhythm section, which comprise the rhythmic-harmonic framework of *son* and salsa, and looked at the relationship between these *tumbaos*, the *clave* and groove. This discussion revealed that, for performers of Cuban musics, groove production is typically associated with rhythm section *tumbaos*, and that these rhythmic patterns, like the *clave*, might embody an important dynamic of tension and release. When repeated, the combined anticipatory and dynamical effects inherent within these rhythmic patterns unite to provide an additional layer of motion, energy and sense of drive to *son* and salsa grooves, and like the *clave* can also be viewed as strident cultural models within these traditions.

In chapters 6, 7 and 8, I integrated micro- and macro-timing data, taken from three different group performances, with verbal accounts taken from interviews with the performing musicians to examine the timing relationships that underpin rhythm section groove in *son* and salsa. Such an integrated approach revealed some interesting timing characteristics. Findings in chapter 6 showed that moment-to-moment temporal fluctuations or instantaneous tempo for the three groups broadly fell within the 20 bpm range, suggesting that levels of temporal variance within these rhythm sections are not random but rather culturally informed and representative of the timing characteristics of the performance of *son* and salsa *montuno* grooves. These findings correlate with the arguments presented by some entrainment theorists who propose that, within context of a given culture, close-knit groups develop a shared sense of time and rhythm that forms the basis of a group identity. Another important feature of Cuban grooves reflected in the timing data was the role played by each instrument within the rhythm section: time keeping instruments such as the bell provide a more stable rhythmic pattern, against which more improvisatory instruments such as the bass and piano/guitar enjoy relatively more temporal and rhythmic freedom. These findings imply that, in addition to the dynamic of tension and release present in the *clave* and other rhythm section *tumbaos*, the characteristic 'steady timekeeper' versus 'improviser' model adhered to within the rhythm section creates an internal tension between the instrumental parts that never finds resolution, thus providing an additional sense of swing, pull and drive to the groove.

In Chapter 7, I examined the connection between micro-timed phase relationships within the rhythm section and groove. This investigation revealed that, although musicians formulate general phase preferences of their own performance, these preferences are subject to continual adjustment and readjustment as they engage in real-time interactions with co-performers in order to negotiate a collective and aesthetically 'correct' groove. Similar in nature to moment-to-moment temporal fluctuations, phase relationships within the three groups did not fluctuate randomly but rather were executed in a controlled and culturally prescribed manner, falling between a range of 20ms or 4°. The examination of

phase relationships at a single cadential point within the rhythmic-harmonic framework, the *bombo*, revealed that rhythm section musicians enjoy a higher level of synchrony at this brief meeting point in time, combining their rhythmic and communicative energies to create a natural accent that helps to reinforce the initiation of tension on the second stroke of each repeated *clave* cycle. Furthermore, the continuous micro-timing adjustments from relatively loose phase synchrony for all shared onsets to a tighter phase synchrony at the *bombo* may have important consequences for the aesthetics and groove of *son* and salsa by creating a dynamical pushing and pulling of time. When contextualised within the repeated rhythmic-harmonic framework, these fleeting micro-timed adjustments add to the characteristic sense of lift and forward momentum in the groove.

In chapter 8, I investigated the relationship between groove and group tempo. These findings reveal that throughout the performance of an entire song there is a tendency for group tempo to increase slightly by 1 to 6 bpm. Closer examination of the correlation between performance structure and group tempo revealed a contrast in temporal characteristics between the *son* and *montuno* sections. The *son* section is characterised by a slightly slower, more stable group tempo while the *montuno* is characterised by a slight increase in tempo with greater temporal variation. Although the timing data suggests that these tendencies are very slight and perhaps imperceptible, musicians' verbal accounts indicate that they are aware of a tendency for the tempo to increase. This slight temporal increase at the transition from *son* to *montuno* holds considerable significance within the tradition, being associated with heightened levels of excitement and energy, and a sense of forward motion in the collective groove. Musicians' verbalisations highlighted a range of interrelated factors that shape this dynamic within the groove. These include changes in instrumental patterns at the *montuno*, specifically the *bongosero* playing the tactus-defining bell pattern, choreographic changes at the *montuno*, the level of socio-musical interaction and entrainment between musicians and with the audience, the performance venue and the interpersonal and intersubjective thoughts, feelings and perceptions of participating individuals.

Ethnographic accounts were used in Chapter 9 to look at the emotions experienced by musicians during effective-collective groove production. These accounts revealed that participating musicians, dancers and audience members can experience moments of bodily excitation, increased levels of energy and heightened emotional states when the collective groove is at its most effective. In line with the findings in previous chapters, the key processes that underpin these emotional states are active participation, synchronous interaction and socio-musical entrainment between musicians, as well as intersubjectively shared knowledge and experiences. Moreover, audience participation through physical movement and dance adds another dynamical layer of kinaesthetic and emotional energy to the groove of collective music/dance events and contributes to the generation of moments of 'musical effervescence', 'communitas' and flow-like states.

Returning to my initial question – what is the nature of a successful groove in *son* and salsa performance? – the above research findings paint a picture of groove that is rich, complex and multi-dimensional. The generation of a successful dance groove in *son* and salsa performance is dependent upon the emotional expressions, rhythmic energy and sensibilities of participating individuals, the ability and willingness of those individuals to engage in thoughtful, purposeful and interactive negotiations with co-performers and performing with a collectivist and participatory attitude to ensemble groove production. The collective groove is the result of the expressive and dynamic timing relationships emerging from the interactive, synchronous and entrained behaviours of musicians, and is framed within and shaped by cultural models and intersubjectively constructed knowledge. Although the responsibility for effective groove production lies primarily with the rhythm section, the full aesthetic potency of the groove of Cuban music/dance events is generated by the combined rhythmic, communicative, kinaesthetic and emotional energies of musicians, dancers and audiences. When all of these aspects of the aesthetic system spontaneously and successfully come together during performance situations a cumulative dynamic energy and feeling of drive and motion is experienced, one that

possesses the power to inspire, excite, energise, invite participation and unite people in joyous celebration.

Contributions and Relevance of the Study

As the primary purpose of this study has been to explore the nature of groove in Cuban dance musics, and in particular *son* and salsa, the findings presented here contribute most readily to the understanding of the aesthetics that characterise these musical traditions. Specifically, my exposition of the function, dynamics and role of cultural models such as the *clave* and rhythm section *tumbaos* has contributed to the understanding of how these archetypal features fit together to generate sensations of energy, motion and drive that is central to the Cuban dance music aesthetic. Similarly, through detailed examination of the timing relationships that underpin well-documented and important structural features such as the *son-montuno*, I have determined the precise nature of the perceived increase in tempo and dynamic across this structural transition, as it actually occurs in real time during performance. While some scholars of Cuban dance musics have discussed the dynamical effects associated with these archetypal features, I feel that by providing a detailed ethnographic and empirical account of how this dynamic manifests itself in live performance situations this study adds an additional layer of understanding that extends those discussions by placing them in a broader contextual and methodological framework.

Although my focus has been on *son* and salsa, throughout this study I have highlighted connections between these styles and other Cuban musics. For instance, in chapter 4 I discussed the relationship between *son* and *rumba claves* and the similar dynamical and timekeeping role they play in their respective traditions. Further, in chapter 9 I drew on interviews conducted with *rumberos* in Havana and Daniel's 1995 research into the dynamic rhythmic energy generated in *rumba* performance. These correlates suggest that many of the findings presented in the present study might contribute to the understanding

of the groove and aesthetics that drive related dance styles such as *rumba*. Given that many of the *rumberos* that I spoke to were also practitioners of *santería*, perhaps my focus on the aesthetics that drive secular performance may also hold some relevance to the study of sacred performance practices in Cuba, specifically the role groove plays in the possession of the *santería* practitioner by the *orisha*.

However, perhaps the most significant contribution made by this study to the understanding of Cuban dance musics, lies in the use of extensive ethnographic fieldwork to elaborate upon the correlations between the socio-musical practices that characterise the groove of this music and the role groove plays in generating a sense of community. While some ethnomusicological studies have emphasised the relationship between Cuban-related grooves and the collective nature of music and dance in performance situations (principally Washburne's 1998 study of swing in salsa) and their work has greatly informed my investigations, I hope that the findings from the present study will complement and contribute to these studies. Furthermore, by drawing on a number of theoretical perspectives and methods I hope to shed new light on and extend existing theorisations of groove and to fill some of the gaps in the ethnomusicological literature with regard to the investigation of the dynamics of groove in Cuban dance musics.

In addition to contributing to the understanding of groove in Cuban musics, this study also makes an important contribution to the wider study of groove in other musical genres. By drawing comparisons with findings from studies of groove in jazz (Berliner 1994, Monson 1996 and Doffman 2008), funk (Danielsen 2006) and other popular musics (Zbikowski 2004) I hope to offer new insights into the nature of groove more broadly. One specific example lies in the investigation of the roles within the rhythm section discussed in chapter 6, where I argued that the 'timekeeper' versus 'improviser' model was pervasive in jazz and Cuban rhythm sections. Although the instrumentation used and the way in which this model in played out during the performance of jazz and Cuban music may differ,

these models provide a solid point of comparative connection between one crucial aspect of groove production in these related musical traditions.

Methodological Contribution

From a methodological viewpoint, the study of groove within the field of ethnomusicology has placed little emphasis on the empirical investigation of the timing processes that underlie its production. An ethnographic approach, which typically focuses on participant-observational fieldwork and musicians verbal accounts, lies at the centre of ethnomusicological methods and therefore often overlooks one vital dimension of collective groove production: the subtly timed micro-interactions between musicians. The timing data in this study provides an objective and measurable account of these micro-interactions and opens a window onto this expressive and nuanced aspect of groove production. An example of the advantage of this approach became apparent in chapter 7 when it was revealed that although musicians formulate and articulate general phase preference, the timing data revealed that during performance these preferences are subject to continuous adjustments as musicians interact to negotiate a collective groove during performance. These findings would remain largely undetected without the detailed investigation of performance micro-timing data. Furthermore, this example highlights the importance of in situ recordings, another central feature of the methodology used within this study. By making this commitment to record real-world performances, the subsequent timing data was more reflective of the rich interactive environment in which musicians normally work than a controlled laboratory environment might be for example.

As the above example suggests, it has also been advantageous to place the objective timing data in dialogue with musicians' verbal accounts of their own understanding of groove, timing and interaction with co-performers. To make this dialogue as fruitful as possible the approach taken during interviews was twofold: firstly, at each interview performers were asked about specific aspects of groove production (e.g. phase

preferences, group tempo and use of the *clave*); and secondly, performers, where possible, were played video clips taken from their own performances. This allowed me to target questions towards particular points of interest during the performance and enquire about performers' thoughts and feelings at that specific moment in time. By moving the interview from the more general to the very specific, it was possible to get closer to the true nature of the intricate, interactive processes at work during live performance. In turn, this process informed the empirical analysis. For instance, the timing analysis of phase relationships at the *bombo* in chapter 7 came about through watching performance videos and asking the performing musicians why they appeared to exhibit accentuated body movements at this specific point in each *clave* cycle. When timing analyses were conducted, heightened levels of synchrony at the *bombo* were revealed, an aspect of performance that was a direct consequence of the dialogue between the qualitative and quantitative approaches.

The methodology used here, which blends interview, video and timing data has the advantage of producing a rich data set that offers new insights into the nature of groove in real-world performance situations. Although the component parts are used in various disciplines (e.g. empirical musicology, music psychology, anthropology), this type of combined methodology has not seen widespread usage in the field of ethnomusicology. However, it offers ethnomusicologists a sophisticated toolkit that can be used to explore how performers conceive of aspects of a musical culture and how they are actually enacted in real-world situations. The benefits of drawing on multiple disciplines was highlighted in chapters 6, 7 and 8 where I considered findings from micro-timing studies, principally within the discipline of music psychology (e.g. Collier and Collier 1994 and Friberg and Sundström 2002), and notions of entrainment in the areas of sociology and anthropology. Just as ethnomusicological research might benefit from an empirical dimension, conversely, a more empirical-orientated approach, typically used in micro-timing studies, might benefit from ethnographic perspectives. The methods used in the present study demonstrate how qualitative and quantitative data can be integrated to

address the lack of ecological validity that is often associated with empirical timing studies.

Contributions to Theory

In the introduction to this study, I outlined the works of Keller, Zbikowski, Doffman and Washburne, with each of these scholars approaching groove from a slightly different theoretical perspective. Scholars who draw on the disciplines of music psychology and music theory, such as Keller and Zbikowski, emphasise the role of intersubjectively shared knowledge and the cognitive structures that enable effective musical joint action and groove production. Drawing on Zbikowski's work, Doffman adopts a similar cognitive-based approach by arguing for the importance of intersubjective cultural models in groove development within the jazz tradition. Doffman also argues that timing relationships and entrainment are of central importance to the development of a sense of sharedness between grooving jazz musicians. Although Doffman primarily draws on psychological theory, he combines these theories with Keil's theory of participatory discrepancies, thus providing a point of theoretical connection between the psychological approach of Keller and Zbikowski, and the Keil's ethnomusicological approach to groove. Approaching the study of groove from a more ethnomusicological standpoint, Washburne draws on Keil's and Turner's theorisations to argue that effective salsa grooves are reliant upon synchronous joint action and interaction, and that when generating an effective groove musicians aim to achieve a state of euphoric togetherness or communitas.

While my approach is grounded in ethnomusicology and therefore adopts a similar theoretical stance to that of Keil and Washburne, in an attempt to provide a richer understanding of the interactive, socio-cultural and participatory nature of groove, I have drawn on theoretical perspectives presented by all of the above-mentioned scholars. In adopting such an approach, I have developed a theoretical framework that integrates notions of intersubjectivity, cultural models, entrainment and collective

effervescence/communitas, and to a lesser extent 'flow', with Keil's theory of groove. This approach has allowed me to address some of the limitations associated with Keil's theory, namely the vague nature of the connection between musical interaction, timing and the up-lifting, participatory feel of groove.

Three examples serve to illustrate how the theoretical approach taken in this study has addressed this issue. Firstly, in chapter 4, the theory of cultural models proved to be extremely useful for examining facets of the *clave,* and in particular, how the *clave* guides aesthetic judgements and interactions between co-performers when generating an effective groove. Furthermore, by combining theories of cultural models with perspectives from music psychology, it was possible to examine the tension-and-release dynamic embodied within the *clave* and how this dynamic might tap into listeners' attentional energy and engage them with the groove of the music. These cross-disciplinary theoretical perspectives extend Keil's theorisations by underscoring the cognitive as well as the social aspects of participation in groove-based musics, a dimension that received little attention in Keil's original work.

Secondly, in chapters 6 to 8. I used entrainment theory in conjunction with timing data to look at the nature of the nuanced and adaptive timing relationships between grooving musicians. By correlating entrainment behaviours, profiled in the timing data, with important cultural models such as the temporal shifts at the *son-montuno* transition and heightened synchronisation at the *bombo*, it has been possible to quantify the subtle timing nuances that underpin Cuban groove production within this broader theoretical framework. Therefore, these findings add empirical as well as theoretical weight to Keil's theory of groove. This is an important contribution because, as Keil has pointed out, his theory of participatory discrepancies suffers from a lack of empirical evidence, in particular the 'discrepancies' dimension of his theory. This additional theoretical and empirical

dimension also contributes to the theorisations presented by PD-inspired scholars such as Butterfield and Doffman, who have also sought to clarify and expand upon Keil's work.

Thirdly, in chapter 9, theories of collective effervescence, communitas and flow provided an extremely useful and powerful theoretical framework for exploring the emotions experienced by participants during collective groove production. By looking in detail at the similarities between the interactive processes and shared knowledge that help to generate feelings of collective effervescence, communitas and flow in social gatherings and similar socio-musical processes that underpin effective-collective groove production in Cuban music, it was possible to identify relationships between entrainment theory, Keil's theory of groove, and the concepts presented by Durkheim, Turner and Csikszentmihalyi. In identifying these relationships this study contributes to PD theory by providing a more solid understanding of the connections between socio-musical interaction, timing and the up-lifting, participatory feel of groove, a central tenet of Keil's theory.

More broadly, I hope that by integrating perspectives from a number of disciplines into a single theoretical framework the approach taken in this study stays connected to the work of scholars such as Zbikowski, Doffman, Washburne and Keil, but also provides additional, important and valuable contributions to the theorising of groove and contemporary studies of musical entrainment within the field of ethnomusicology.

Limitations and Future Directions

Inevitably, throughout the course of this study many important questions and issues have emerged that go beyond the investigative boundaries that have limited this research. The following text outlines three possible areas of future research that would both extend and complement the study of groove and aesthetics in Cuban dance musics presented here.

Firstly, in chapters 4 and 5 I examined the dynamic of tension and release in the *clave* and other key rhythm section *tumbaos*. Perspectives from the discipline of music psychology suggest that when repeated this dynamic has the ability to tap into the fundamental features of human cognitive systems, grab the listeners' attentional energy and generate a sense of engagement. These perspectives raise the interesting question: to what degree are these dynamical effects cross-cultural and to what degree are they context specific? Therefore, a fruitful line of future research would be to investigate the participatory nature of clave-based musics in a number of different cultural contexts using participants of varying levels of enculturation in order to determine if the perceived tension-and-release dynamic is cross-cultural or whether it is a more culturally-codified phenomenon. This is a particularly pertinent line of research when the case of *salsa* is considered, a clave-based musical form that continues to unite people from markedly different cultural backgrounds around the world in celebratory music and dance. Is salsa's apparent power to bring people together primarily reliant upon the dynamic rhythmic features such as the *clave* or is salsa's broad appeal the result of extra-musical factors such as its involvement with the multinational music industry? Alternatively, perhaps it is a combination of these musical and extra-musical factors that have contributed to salsa's international appeal.

Secondly, in order to provide a fuller account of the nature of groove in Cuban dance musics I drew on literature that details aspects of groove in a number of related musical styles. For example, in chapter 4, I explored connections between the *clave* and the standard bell pattern found in many styles of West and Central African music and when looking at phase relationships in chapter 7, I explored connections between this aspect of groove production in Cuban music and similar phenomena in the related styles of Brazilian samba, funk and jazz. Perhaps then, a comparative study of the interactive processes that underlie the groove in these styles would shed new light on the important relationship between African, Cuban, Afro-Caribbean and African-American musical forms. Such a study would complement the work of scholars who seek to understand the

complex nature of the socio-cultural and musical relationships between the music and dance forms of the black Atlantic (e.g. Agawu 2006; Boggs 1992; Floyd 1999; Gilroy 1993; Kattari 2009; Kubik 1999; Manuel 1995; Peñalosa 2009; Urfé 1984, Wilson 1974). Given the central importance of groove in generating a sense of participation, collectivity and group identity, it is my feeling that a groove-based perspective would contribute further to a more socially informed discussion of the complex issues surrounding the relationship between Cuban and other African-influenced musical styles.

Thirdly, in chapter 9 I examined the close relationship between the collective groove and participation through physical movement and dance. A potential limitation of the approach used here was that I did not consider the timing relationships between the bodily movements and footwork of dancers and musicians and groove production. During interviews, a number of musicians spoke of the interconnectedness between groove and dance, and in particular, a *rumbero* explained how different parts of the body move in synchrony with certain rhythms: the *clave* synchronises with upper body movements and the lower body with the bass *tumbao* pattern, for example. Therefore, a study of the synchronous timing relationships between dancers' movements and specific features within the rhythm-harmonic framework of groove would be a fascinating extension to the empirical work presented here. Furthermore, if this empirical work were to be combined with ethnographic insights, it would speak directly to the ethos promoted here: to integrate timing data and performers experiences in an attempt to understand further the shared knowledge, aesthetics and intricate socio-musical processes that characterise the skilfully crafted grooves of Cuban dance musics.

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